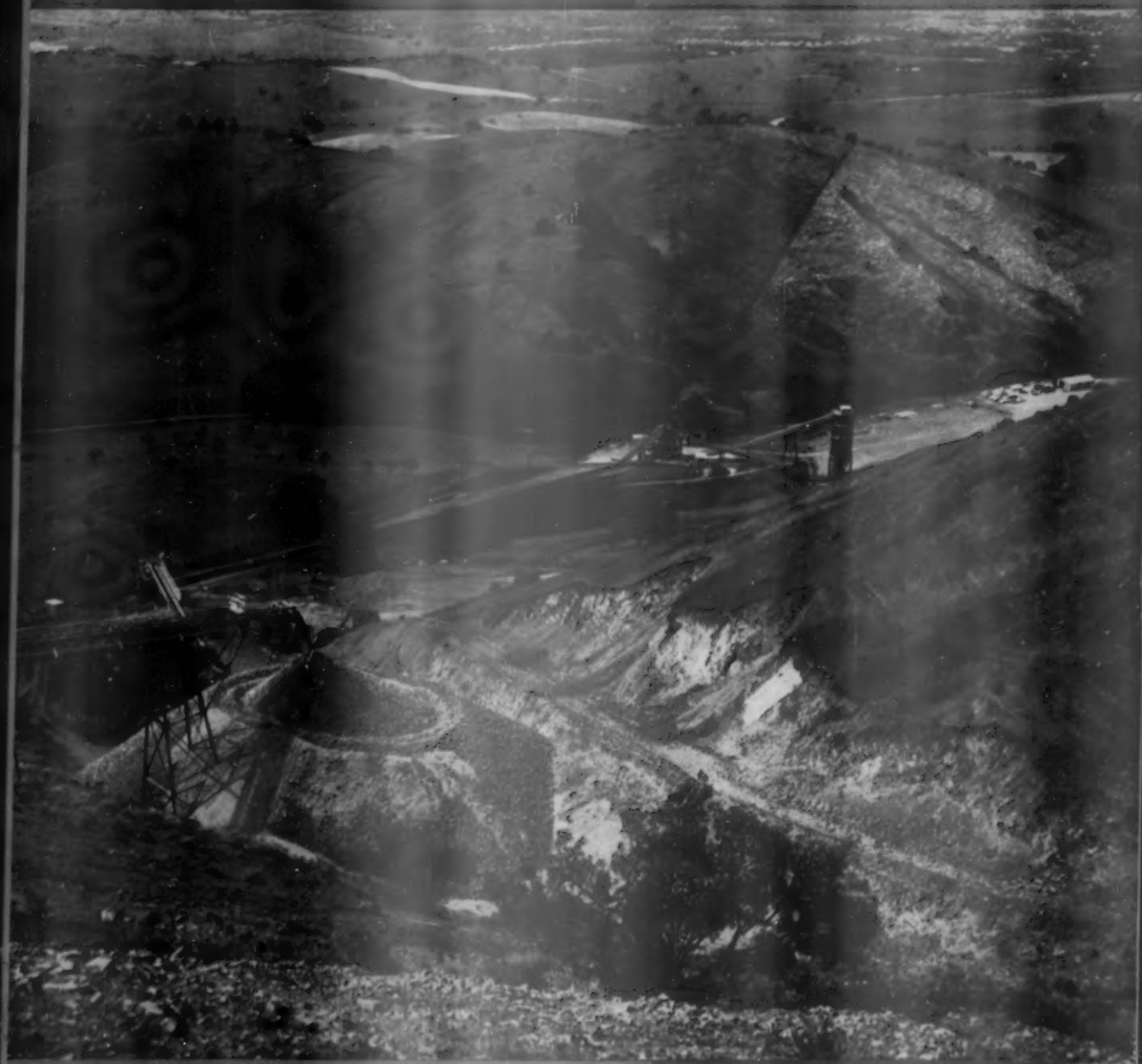
THE INDUSTRY'S RECOGNIZED AUTHORITY

ROCK PRODUCTS

LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

Dutch Cement Plant Makes Fertilizer from Stack Dust page 66
Push-Button Controlled Crushed Stone Plant page 72
Recovering Uranium As Phosphate By-product page 96
Gravel Concern Expands Into Ready-Mix and Block page 110



Aerial view of the Henry J. Kaiser Co. plant near Clayton, Calif.

OCTOBER 1955

THE NEW D7, D8 and D9

here's what they can mean on your job

The new 286-HP CAT* D9 Tractor

Choice of torque converter or oil clutch drive. First track-type tractor with Turbocharger. Completely new 286-HP engine. "Live-shaft" drive for rear-mounted equipment. Many other important features.

The new 191-HP D8

With torque converter (Series D). With exclusive oil clutch drive (Series E). Completely new 191-HP engine. "Live-shaft" drive for rear-mounted equipment independent of flywheel clutch. New easy-working controls. Many other improvements.

The new 128-HP D7 Series C

Gear-type balancer gives six-cylinder smoothness. New 128-HP engine. Drawbar pull now 28,700 lb. maximum. New starting engine for simpler, easier operation. Track shoes hardened by "water quench" process. And many other important advances.

The year's biggest news on tracks: Caterpillar's three great new Diesel Tractors.

They're big news because they give you greater power and better performance than ever before.

The D9 and D8, for example, give you your choice of torque converter or exclusive oil clutch drive so you can best match your machine to your own job requirements.

All three give you features like one-piece frame-steering clutch case assemblies, and track shoes specially hardened by a new "water quench" process which means longer shoe life.

All three are easier to operate, with simpler, more powerful starting engines, easier working controls and other improvements.

They're easier to service, too; an exclusive trouble-free oil clutch, separately removable power train components and a fuel system that needs no adjustments in the field are only three of many reasons why.

Better be sure you get *all* the news about the new D7, D8 and D9. Call your Caterpillar Dealer today. Or mail the coupon below.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

MAIL TODAY!

CATERPILLAR TRACTOR CO., Peoria, Illinois, U.S.A.

I'd like *all* the big news about the new D7, D8 and D9.

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Company _____

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THE NEW D9, D8 AND D7 —EXAMPLES OF CATERPILLAR LEADERSHIP IN ACTION

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Ore carrier made by Goodman Mfg. Co. South Haven, Mich.

Here comes uranium for the atomic submarine

A typical example of B. F. Goodrich improvement in rubber

OUT of that hole comes the powerful stuff that will make atomic fuel. Climbing up the narrow, twisting tunnels of the uranium mine are trucks so small and compact that there's no room for clutch and gears. Instead they use V belts to run them. But for a while this type of truck wasn't practical because the belts kept breaking. They sometimes lasted only a few days.

All kinds of belts were tried but they couldn't stand the jolting starts and stops, heavy loads, rough driving. Some would snap like pieces of string.

Then the manufacturer heard about Grommet belts invented by B. F. Goodrich engineers. The grommets are two extra strong cord loops inside the belts, like twisted cables except they're endless. High-capacity Grommet belts were put on the trucks. They're so much stronger they last months instead of days.

Product improvement like this is *always* going on at B. F. Goodrich. New ways are constantly being found to make V belts, conveyor belts and hose work better, last longer. No product is ever regarded as "finished" or standardized.

How this cuts your costs: Biggest cost savings come almost always from top performance rather than lowest prices. If you use rubber products, remember B. F. Goodrich is one company that will *never* lower its quality standards. This means you can be sure of top performance and real money savings when you buy from your B. F. Goodrich distributor. *The B. F. Goodrich Company, Dept. M-485, Akron 18, Ohio.*

Grommet—T. M. The B. F. Goodrich Co.

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ROCK PRODUCTS

THE INDUSTRY'S RECOGNIZED AUTHORITY — LARGEST PRODUCER CIRCULATION IN THE HISTORY OF THE FIELD

October 1955

This Month

What's Happening 25

Editorial—Signs Grow that Railroads Intend to Meet Competition 47

Rocky's Notes—Poison in the Concrete Soup? 49

Labor Relations 51

People in the News 53

Industry News 57

Hints and Helps 60

New Machinery 62

Dutch Cement Plant Returns Recovered Dust to Firing End of Kiln 66
Stack dust is recovered with an electrical precipitator collector with the major portion returned into firing end of kiln; remaining finest particles are sold for fertilizer *K. L. A. Van Der Leeuw*

Compact, Efficient Gravel Plant Operated by Baker, Mitchell, Thwing & Co. at Oro Grande, Calif. 69 *Walter B. Lenhart*

"Powerama" Dramatizes Diesel Power 70

Efficient Sand Recovery System at New Quigley plant of Fort Worth Sand and Gravel Co. 71

Push-Button Controlled Stone Plant 72
One man controls all equipment from surge pile through stockpiling in Henry J. Kaiser Co. stone plant near Clayton, Calif. Installs dust control. *Walter B. Lenhart*

Triple Capacity of Crushed Stone Plant 76
Somerset Crushed Stone, Inc., holds Open House to celebrate completion of $400,000 addition to Bernardsville, N. J. plant and tenth anniversary of ownership *Kenneth Gutschick*

How to Get the Most Out of Vibrating Screens *J. R. Brandon* 90

Recovering Uranium as a By-product in Phosphate Plants 96 *James A. Burr, Jr., John W. Rush and Ralph F. Berlik*

Making Cement Clinker and Sulphuric Acid in the Same Plant 106

Radcliff Gravel Diversifies by Developing New Products and Markets *Hubert C. Persons* 110

Rotary Kiln—Its Performance and Development 118 *Victor J. Azbe*

Calcination of Lime by Indirect-Fired Batch Process 126 *Frank Gibadlo*

Grinding Media Studies Result in Reduced Costs 136

CONCRETE PRODUCTS—

Automation Applied to New Ready Mix Plant 195
The Hovey Concrete Co., Flint, Mich., installs electronic controls in recently completed batching plant *W. R. Miller*

Move Block in Trains from Autoclaves—Chandler Materials Co., Tulsa, Okla. *Tip Brown* 198

Concrete Progress Around the World *Arthur C. Avril* 206

Cinder Block Convention Discusses Curing Problems and Aggregates 208

A Strike—Lessons for the Future *Jos. A. Nicholson* 214

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You can't beat this combination . . . exclusive EASTON electric overhead dumping system and EASTON doorless pan trailer. Dependable dumping is the crucial factor in all modern mine and quarry transportation.

(Told from a crusher attendant's point of view)

"HERE, AT THE CRUSHER, is where you see how EASTON pays off! It's the only equipment specially built for this work —steady shuttle service between shovels and crushers. Savings you make *right here* with EASTON pile up all day.

"Watch that big EASTON trailer roll straight in . . . no backing and turning. It's not carrying the 1000-pound dead weight of a temperamental body hoist. The driver doesn't have to dump a load that he can't watch. He sits there while I take over with the EASTON automatic electric overhead hoist.

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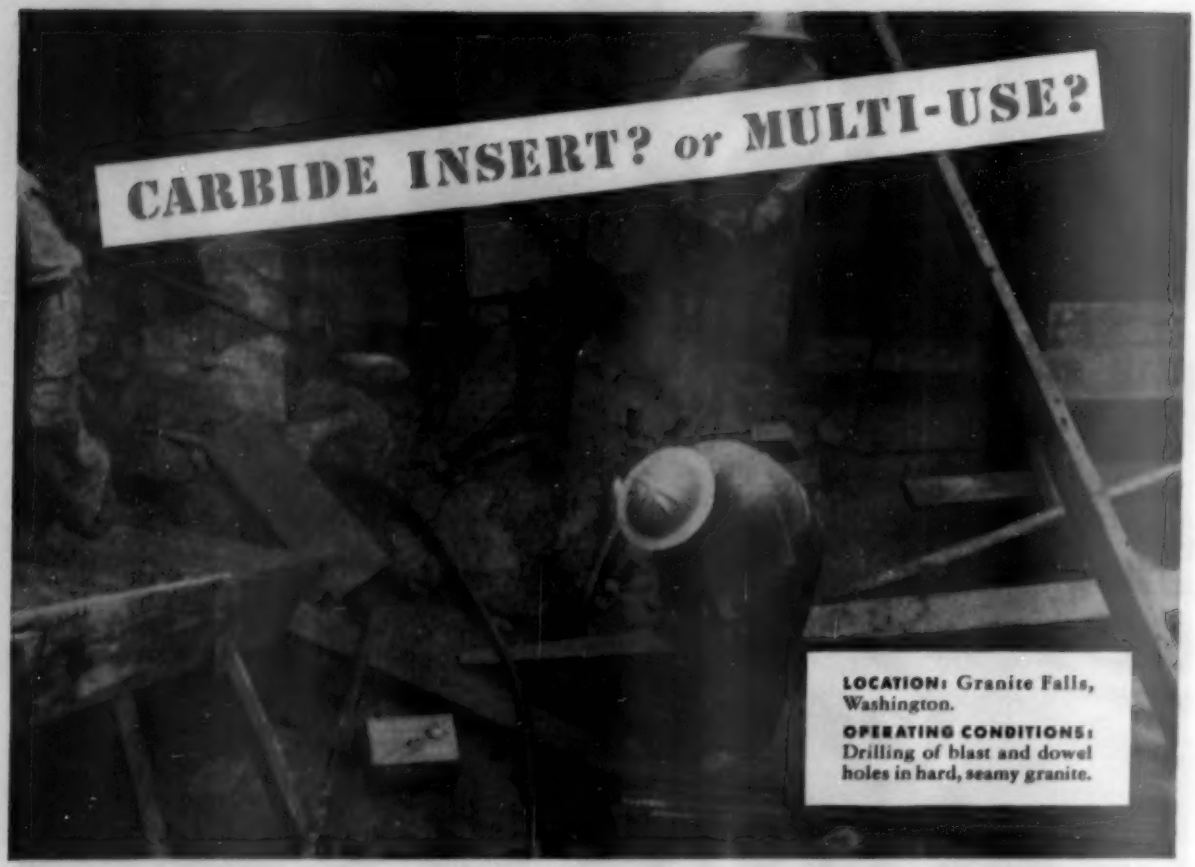
EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

Your money is saved (or lost) at the dumping point. For the most efficient system you can own get the advantages of EASTON's exclusive background of experience and the EASTON automatic electric overhead hoist. EASTON trailer capacities range from 10 to 36 tons.


CARBIDE INSERT? or MULTI-USE?
LOCATION: Granite Falls, Washington.
OPERATING CONDITIONS: Drilling of blast and dowel holes in hard, seamy granite.

TIMKEN® carbide insert bits give more hole per bit through blocky granite on Granite Falls Fishway

THE Scheumann & Johnson Company of Seattle had to drill blast and dowel holes in extremely hard, seamy granite when constructing baffles for the world's largest "vertical-baffle" salmon fishway at Granite Falls, Washington. For highest economy drilling through this hard ground, they chose Timken® *carbide insert* bits for the job.

Timken carbide insert bits permitted high speed drilling with minimum bit changes. And the job superintendent reports that the Timken carbide insert bits made it possible to drill out full increments of drill steel.

But Timken carbide insert bits may not be the best answer for *all* your drilling problems!

In softer, less abrasive ground, Timken *multi-use* bits, correctly controlled and reconditioned, give you the lowest cost per foot of hole when you can drill out full increments of drill steel.

Both types of Timken bits are interchangeable in the same thread series. And a wide range of different Timken bits fit the same drill steel. When the ground changes, you can switch bits quickly and easily, right on the job.

The Timken Rock Bit Engineering Service can offer you over 20 years of experience in recommending the best bit for the job. We'll be happy to help you. Write: The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Timken threaded multi-use rock bit

Timken threaded carbide insert rock bit

your best bet for the best bit ... for every job

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

When your business is ROCK

YOU NEED A REAL ROCK SHOVEL!

HERE is the quarry of the Falls City Stone Co. at Fern Creek, Ky. The Model 6 in the foreground is the third Northwest purchased by this company. One of the older Northwests is shown above.

The business of Falls City Stone is ROCK and their shovels are in a sense, their factory. When you figure it this way, you can't afford to jeopardize production by owning anything but the best. Falls City proved their Northwests on tough rock digging. The fact that their third machine was again a Northwest, speaks for itself.

Northwest low-cost operation and performance — but above all Northwest *dependability* — are the things that make one out of every three Northwests sold a repeat order. They are the Northwest advantages that make outfits like Falls City Stone buy Northwests again and again.

If you have a *real* Rock Shovel you never have to worry about output in any digging. There is a Northwest for every job. Let us answer your questions. Ask for a catalog on the size machine you need.

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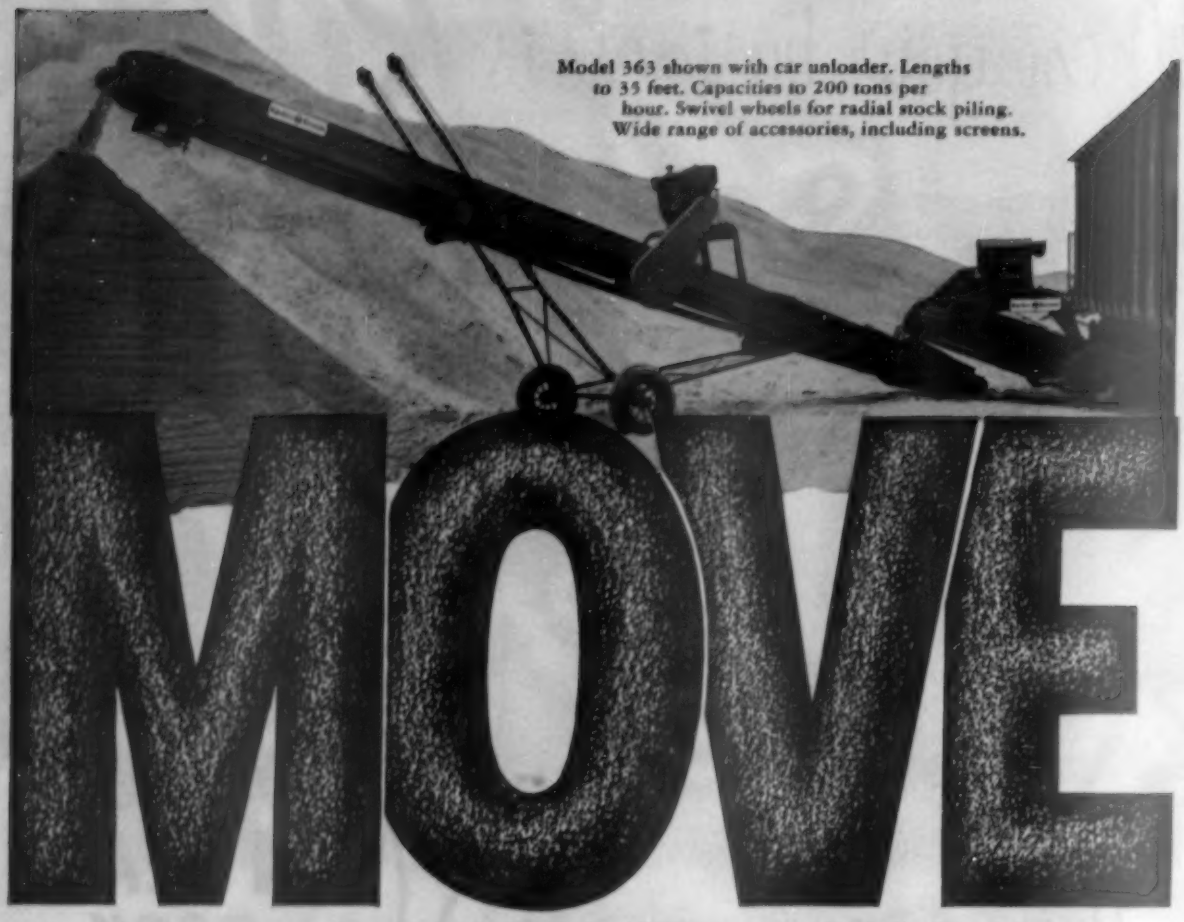

Model 363 shown with car unloader. Lengths to 35 feet. Capacities to 200 tons per hour. Swivel wheels for radial stock piling. Wide range of accessories, including screens.

MOVE

MOVE bulk materials the cheapest way.

Model 374 shown with flanged wheel for radial stock piling. Available with steel wheels or pneumatic tires. Lengths to 60 feet. Capacities to 430 tons per hour. Wide range of accessories, including vibrating screens.

MOVE sand, gravel, cement, wet concrete, coal, coke, ashes, chemicals — almost any bulk material.

MOVE with machines that are truly portable — easily moved around the yard, or towed on the highway.

MOVE materials continuously with less horsepower, less labor, less cost.

MOVE today toward greater profit.

Let us show you how Barber-Greene can reduce your costs.

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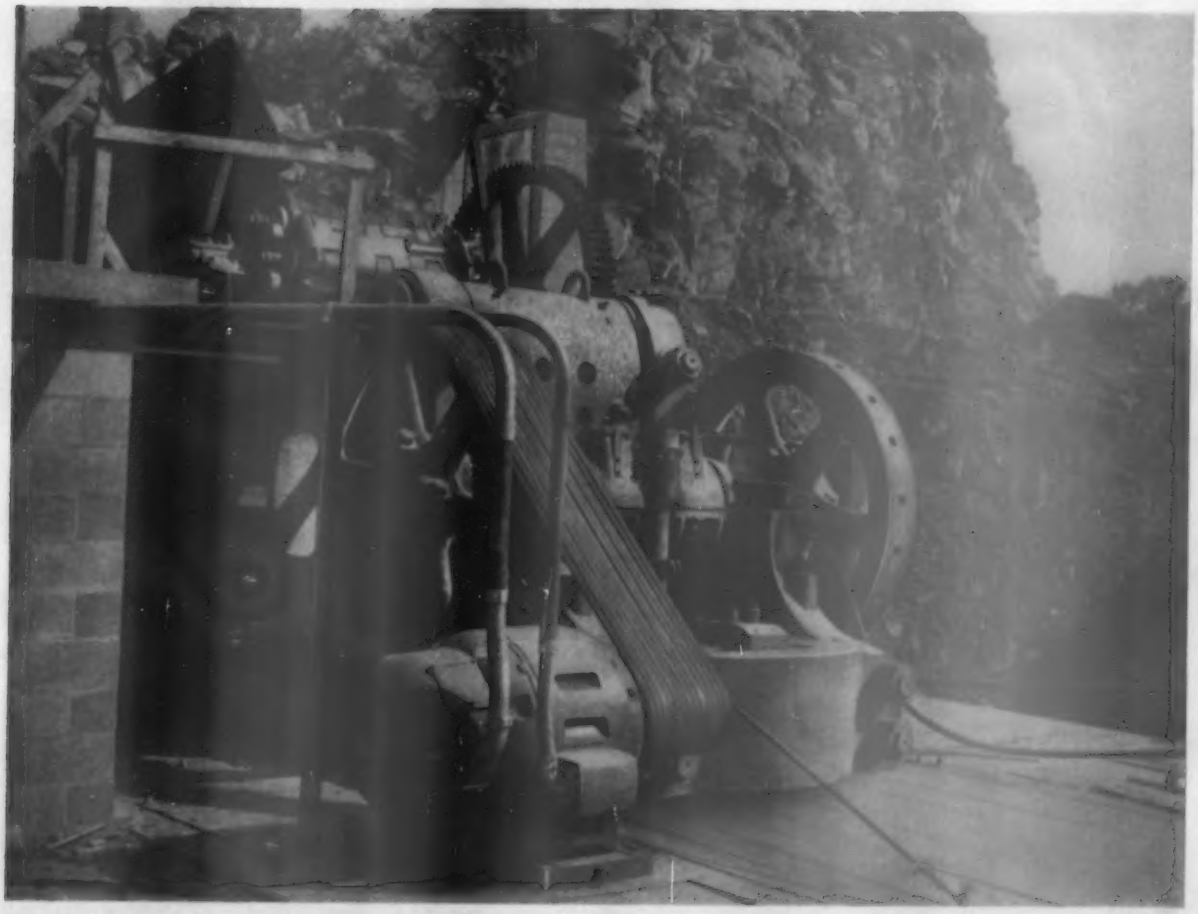

Plate replacement cut to a third with a Traylor Jaw Crusher

According to many user reports, Traylor Curved Jaw Plates often outwear conventional plates by as much as 3 to 1! Wear is distributed evenly over the entire face of the plate. At the same time, power waste is reduced to an absolute minimum.

As a result, Traylor Jaw Crushers, with curved jaw plates, offer a combination of long plate life and low power costs unequalled by any other crusher of equal capacity.

One operator reports that the Traylor curved jaw plates in his 60" x 84" crusher are still good after almost three years of tough service. This one set of plates has crushed 2½ million tons of run-of-the-mine ore to 4½".

Four types of Traylor Jaw Crushers offer a wide range of product capacities, from 4 tons up to 1,000 tons per hour. Write today for complete information on the Traylor Jaw Crusher best suited to your requirements.

TRAYLOR ENGINEERING & MFG., CO.
1715 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
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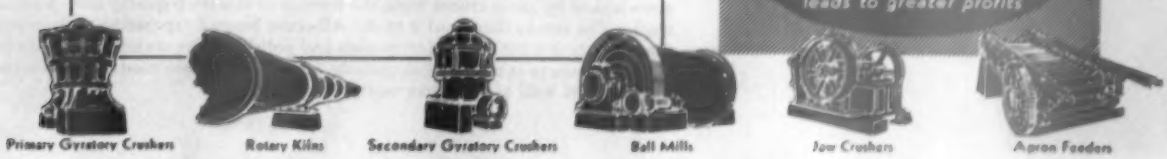
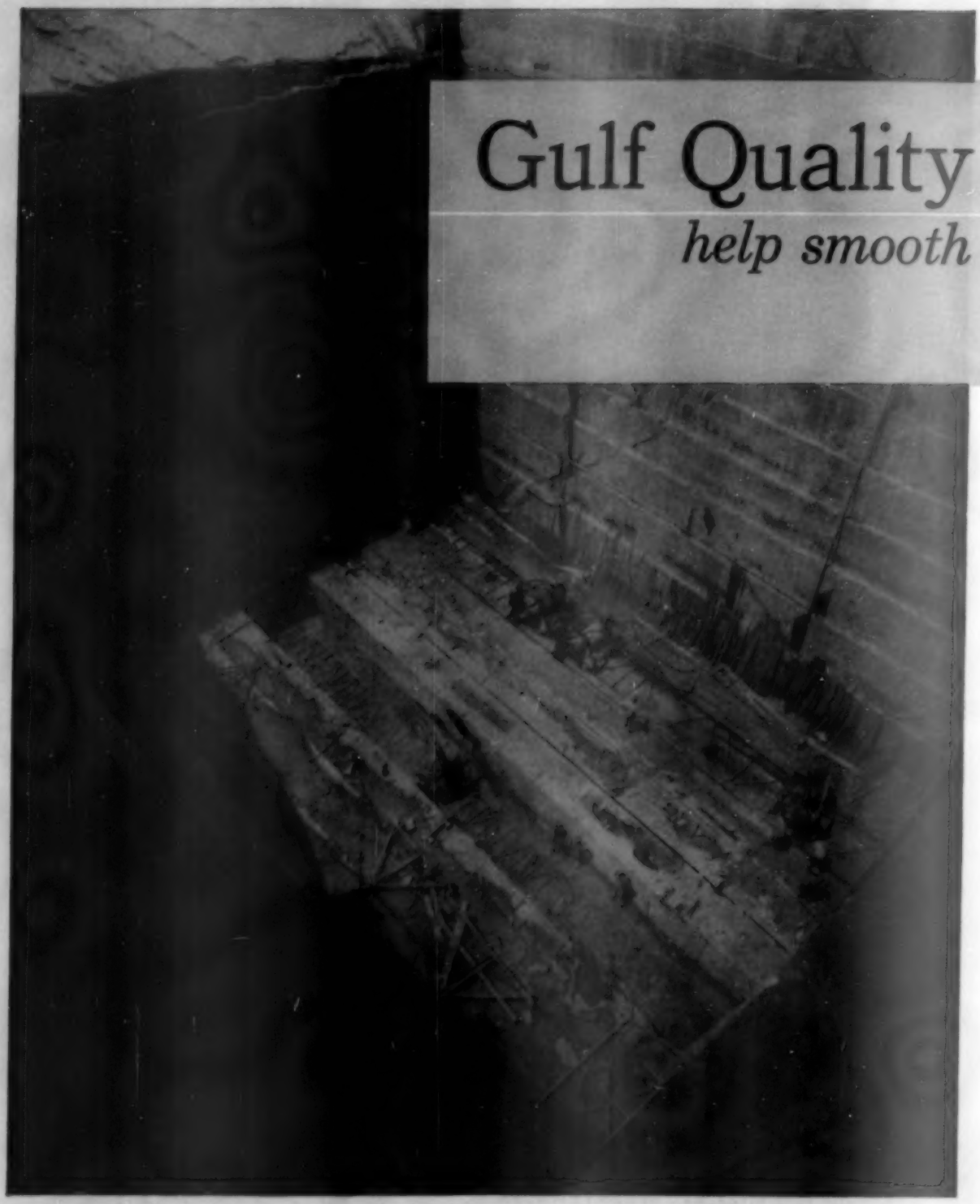
A Traylor leads to greater profits



Gulf Quality
help smooth



Huge blocks of hard stone, or serpentine tremolite, as it is known in the trade, are whisked by giant cranes from the bottom of this deep quarry onto waiting trucks. The trucks then haul it to the Alberene Stone Corporation's processing plant where it is cut into different sizes and polished. The majority of the stone from this quarry is used architecturally. Gulf products are used in the processing plant, as well as in quarry equipment.

Lubricants and Fuels

quarrying operations at Alberene Stone Corp., Schuyler, Va.

For eight years the Alberene Stone Corporation has been carving huge blocks of hard stone from their No. 3 quarry deep in the Virginia mountains. Their formula for smooth, dependable equipment performance is Gulf Lubricants and Fuels, plus Gulf's excellent engineering service that makes certain the right products are used for every unit and climatic condition.

Take stock, as this progressive firm has, of the many advantages Gulf provides to help you get a smoother over-all operation and lower maintenance costs. (1) Lubricants that give an extra margin of protection against wear; (2) fuels that burn evenly and completely with fewer engine deposits; (3) expert petroleum engineering counsel; (4) prompt delivery service.

Call in a Gulf Sales Engineer and discuss with him how Gulf products and fine service can benefit your operation. Check the telephone directory for the number of your local Gulf office.

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1822 GULF BUILDING, PITTSBURGH 30, PA.

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OWNERS REPORT THE DECISIVE DIFFERENCE IN NEW

TD-18A Performance

"It can self-load and deliver fastest" "International TD-18A improvements like the new 300% stronger track frames and cartridge-type roller seals increase production, machine life, and operating ease. As for power, our new TD-18A can self-load the 8-11 cubic yard scraper and deliver fastest of any crawler we ever had." *Here's proof extra traction matches the TD-18's power increase!* G. W. Owen, McDonough, Ga.

"Every load's a payload" "My TD-18A International Drott is built for the operator's comfort. I know, because I'm the operator. It has 360° visibility which no other loader has. Every load is a payload." *No other outfit built gives you the TD-18's combination of power, visibility and responsive controls.* V. S. Steffes, Owner, Earthmoving and Clearing, Batavia, Illinois.

"Operators fight for new TD-18A!" "The TD-18A's were always good—fast, trouble-free performance and low operating cost made me money. The new model TD-18A is stronger and really planned for the man in the seat. It has operators fighting for it." Big, wide, comfortable cushions; hydraulic steering control boosters, and levers, conveniently grouped on the roomy, non-skid deck! *No wonder TD-18A handling ease turns "skinners" into high-producing operators throughout the day!* M. B. McKee, McKee Construction Co., Chickasha, Oklahoma.

"Uranium search toughest of all!" "I'm in the hardest work I know of—building roads into uranium claims, rim-cutting development work. The TD-18 we used for six years had the motor overhauled after five years, and when we traded a year later the transmission and drives were still original equipment. I believe this heavied-up new model TD-18A is by far the best of all." *Advances like the new bridge-strong welded track frames, stronger transmission and exclusive cartridge-type track roller seals back his judgment.* O. Frost Black, Owner, Blanding, Utah.

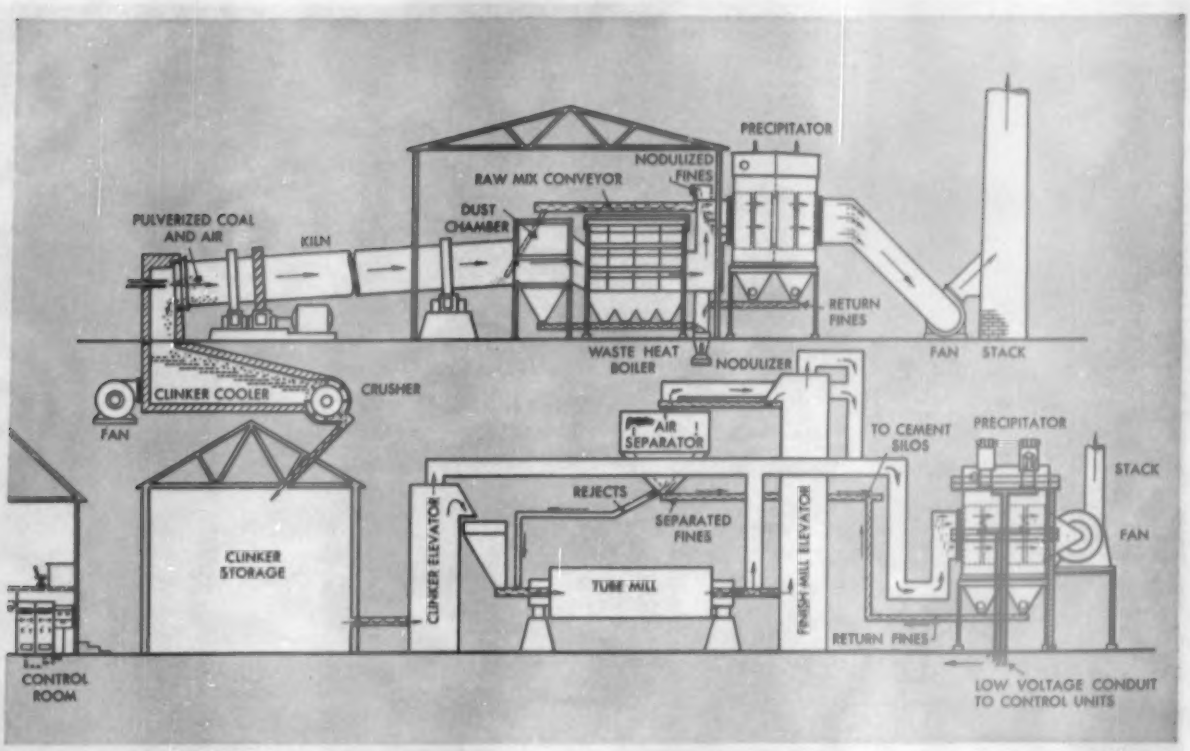
Ease into the foam-rubber-padded, panoramic-vision seat and see the *decisive difference*. Try new finger-tip power steering, and other big *job-easing incentives* for boosting production, as developed only by International. Prove TD-18A *full-power traction*—note, too, how the gear train is beefed-up to transmit 103 drawbar hp, and then some! Measure what new *300% stronger track frames* mean *for full-capacity performance* under slam-bang conditions. Compare how new *cartridge-type track roller seals*, and other International *downtime-prevention engineering*, beat anything else on tracks. Ask for a new TD-18A demonstration!

INTERNATIONAL HARVESTER

INTERNATIONAL

INDUSTRIAL POWER

MAKES EVERY LOAD A PAYLOAD



How dust collecting problems are handled in the modern cement plant

The "why" of the Cottrell precipitator is well known to cement plant personnel—its use in nuisance abatement and cement dust salvage is well established. These diagrams explain the "how" of the Cottrell, including its familiar application to kiln gas and, more recently, its use in the ventilating system of the finishing mill.

Kiln Gas

The upper half of the drawing shows a Cottrell for cleaning kiln gases. They are first passed through a dust chamber to the waste heat boiler and from there to the electrical precipitator, where the dust is removed. Salvaged dust is returned by conveyor to the process. The cleaned gas is discharged to the atmosphere through an induced draft fan and the stack. (Wet process kilns may also be fitted with Cottrells).

And In The Finish Mill

Dust from the grinding mills has always been a major problem. The lower half of the diagram shows the recent application of the Cottrell for cleaning finish mill ventilating system gases. Cement dust is collected from the ventilating system serving the separators, conveyors and elevators. As before, recovered dust is returned to the process.

Separating Small From Large Particles

When large particles of low alkali content must be separated from very small particles of high alkali content, an integrated mechanical-electrical precipitator will do the job effectively. The mechanical element handles large particles, and the electrical element collects the smaller particles that escape it.

Rapping Puffs Eliminated

With Research-Cottrell's electronically controlled Magnetic Impulse Rappers, there is no need for rapping shutdown periods or dampers. Automatically controlled and operated, the MI Rappers continuously rap the electrodes throughout precipitator operation, thus avoiding dust re-entrainment in the gas stream and assuring optimum precipitator performance at all times.

Many Design Advances

The MI Rapper is one example of many improvements that have taken place in the design of precipitators and their associated electrical equipment. Forty years of experience have provided Research-Cottrell with a rich store of engineering skill—it is this skill that has evolved the modern Cottrell precipitator, embodying a design based on knowledge gained through more than 2000 precipitators in many different fields. Fourteen of these have been installed or are under construction for cement plants. All of these precipitators were custom-engineered to individual specifications.

For a more complete description of the Cottrell precipitator, write to Research-Cottrell for Bulletin GB.

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Measure excavators by
price per pound of lift capacity

In analyzing shovel operation, you will find that price per pound of lifting capacity on crane rating is also an excellent measurement of excavator value.

Remember, lift capacity is *work capacity*. Obviously, the machine with the heaviest lift rating not only picks up larger crane loads — it also has more strength, extra speed and stability to handle bigger loads faster with every excavator attachment.

Check Koehring lift ratings shown below — then ask your Koehring distributor to give you the figures on price per pound of lifting capacity.

Compare for yourself:

KOEHRING MODEL	SIZE DIPPER	KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines — 85% of tipping load)		PRICE PER POUND OF LIFT CAP.*
205 CRAWLER	½-Yd.	20,000 lbs.	30-foot boom at 10-ft. radius	?
205 ON RUBBER	½-Yd.	30,000 lbs.	25-foot boom at 12-ft. radius	?
304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-ft. radius	?
304 ON RUBBER	¾-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	?
405 CRAWLER	1-Yd.	40,000 lbs.	40-foot boom at 12-ft. radius	?
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-ft. radius	?
1005 CRAWLER	2½-Yds.	159,000 lbs.	50-foot boom at 12-ft. radius	?

*Figures available on request—ask your Koehring distributor to see them.

STURTEVANT MICRONIZER* GRINDING MACHINE

Grinds Materials To Any Micron Size Specification

NOW AVAILABLE FOR OUTRIGHT SALE

24" Size
Capacities 1000 to 1200 lbs. per hour

The Sturtevant *Micronizers* are fluid jet grinding machines designed to reduce solid materials to particle sizes in the micron range.

Using compressible fluids, air or steam, as the source of energy, *Micronizers* produce pulverized materials to specifications unobtainable by other mechanical equipment such as ball, pebble or hammer mills.

The variety of materials processed is large and includes both nonmetallic and metallic minerals and ores, metals, pigments, insecticides, fungicides, pharmaceuticals, plastics, dyes and numerous other organic and inorganic products.

It is quickly and easily cleaned on changes of formulation with minimum loss of material. Simple to install and operate. It is available as a machine alone . . . or as a complete grouping with premixing, grinding and bagging equipment. Write for complete information, today.

*Micronizer is the Registered Trademark of the Sturtevant Mill Company.

Sturtevant Dry-Batch Mixer for mixing materials into a homogeneous mass. 5 models: ¼ to 2 tons.

STURTEVANT MILL COMPANY

102 CLAYTON STREET, BOSTON 22, MASS.

Designers and Manufacturers of CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS
MECHANICAL DENS and EXCAVATORS • ELEVATORS • MIXERS

SECO SCREENS "PUT IT THROUGH"

AT FRONTIER STONE PRODUCTS, INC. LOCKPORT, N. Y.

SMOOTH, TROUBLE-FREE SECO SCREENS KEEP STONE UP TO SPECS FOR FAST GROWING PRODUCER

The big, modern plant of Frontier Stone Products, Inc. at Lockport, New York is a model of production efficiency. And being high production minded, they have chosen six Seco Vibrating Screens to handle the production of stone to N. Y. State specs. As Bob Maxwell, plant superintendent for Frontier says, "Our Seco Screens are very dependable."

SEND FOR NEW SECO CATALOG #204

SECO

TRUE CIRCULAR ACTION

VIBRATING SCREENS

EFFICIENT SCREENING MEANS BETTER PROFITS

Today's demands for cleaner, more uniform sand, ag lime, gravel and stone are bringing increased sales and greater profits to operators with Seco Screens on their jobs. How about you? Let Seco engineers help you screen it right. Over 350 models.

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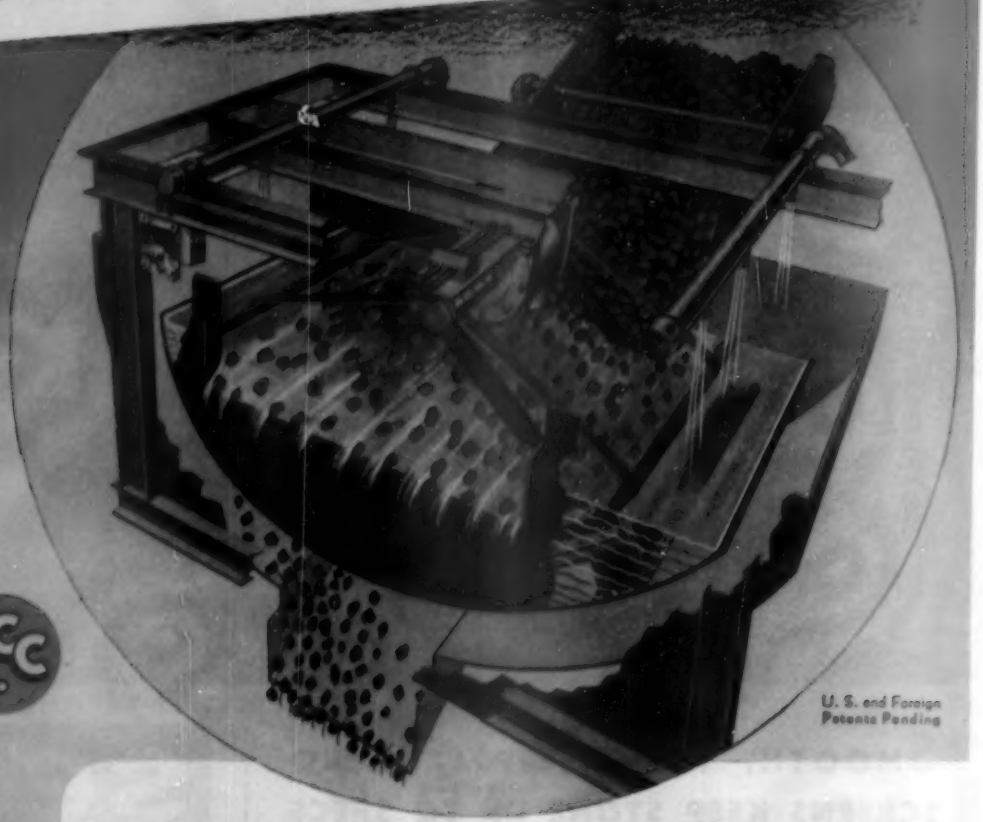
We Invite You to Investigate

THE NEW 'OCC' VESSEL

A Notable Development in HMS



U. S. and Foreign Patents Pending

Send for Information on Complete Pilot Plant Demonstration and Testing Services

OCC VESSEL INTRODUCES UNPRECEDENTED SIMPLICITY

The new OCC vessel represents the successful realization of the main advantage of the HMS process: -- its utter simplicity. The simplicity and efficiency of the OCC vessel are shown by these 6 noteworthy features: --

- High separating efficiency.
- Low operating, maintenance costs.
- No rotating parts in the medium.
- Open vessel; separation visible.
- Quiet pool; no adverse turbulence.
- Quickly adjustable rake speed.

Complete HMS testing, plant designing and installation services.

The ORE & CHEMICAL CORP.

Division: Mining & Milling Machinery

80 BROAD ST., NEW YORK 4, N.Y.

NEW UTILITY CRANE

the self-propelled, 15-ton capacity UC-68

Here's the only utility crane that offers you true power hydraulic control!

THE new one-man operated Link-Belt Speeder UC-68 features Speed-o-Matic — fingertip power hydraulic control. It's the system that's designed to provide easy, fast, smooth response . . . ideal control for speed with accuracy. It's engineered to reduce operator fatigue—enable him to maintain greater output with less effort.

What's more, this new machine features extra strength in the upper machinery, extra ruggedness in the lower . . . over-all greater "live" weight and more "net" hp.

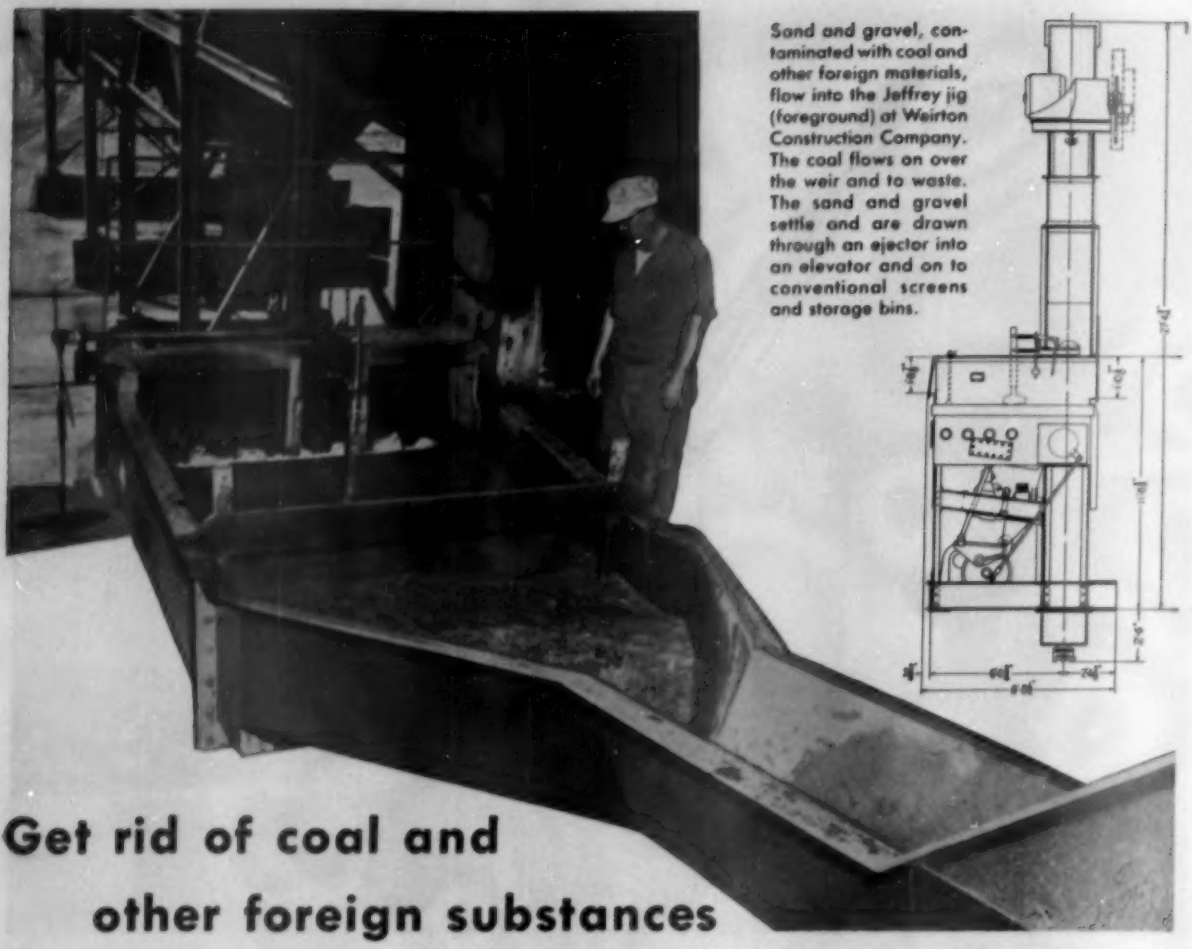
Fully convertible to any front-end attachment, it's ideal for both work-and-run assignments or high-speed production jobs. For details, contact your distributor, or write for Catalog 2566.

Check these advantages!

- All-welded, stress-relieved upper frame
- Extensive use of anti-friction bearings
- Power unit with torque converter
- Interchangeable, self-compensating Speed-o-Matic clutches
- Independent rapid boomhoist with raising and lowering clutches
- Power hydraulic steer and hydraulically operated stabilizers
- Easily removable front and rear outriggers, optional extra

LINK-BELT SPEEDER

Link-Belt Speeder Corporation • Cedar Rapids, Iowa



Sand and gravel, contaminated with coal and other foreign materials, flow into the Jeffrey jig (foreground) at Weirton Construction Company. The coal flows on over the weir and to waste. The sand and gravel settle and are drawn through an ejector into an elevator and on to conventional screens and storage bins.

Get rid of coal and other foreign substances

Make your aggregate more marketable

Sand and gravel operators have a golden opportunity to increase production and profits with this *new* heavy-duty Sand and Gravel Jig.

It brings to the rock products industry the principle of cleaning with pulsating water, as made famous in Jeffrey Coal Washing Jigs. This jig removes coal, shale, clay, roots and sticks — producing sand and gravel of marketable grade at up to 75 TPH.

Weirton Construction Company has had two of these jigs in operation for several years. They report satisfactory performance with low maintenance and few delays.

Jeffrey laboratories are now conducting washing tests on many types of minerals. Our engineers are ready to consider *your* problem.

Write for Bulletin 892.

THE JEFFREY MANUFACTURING CO.

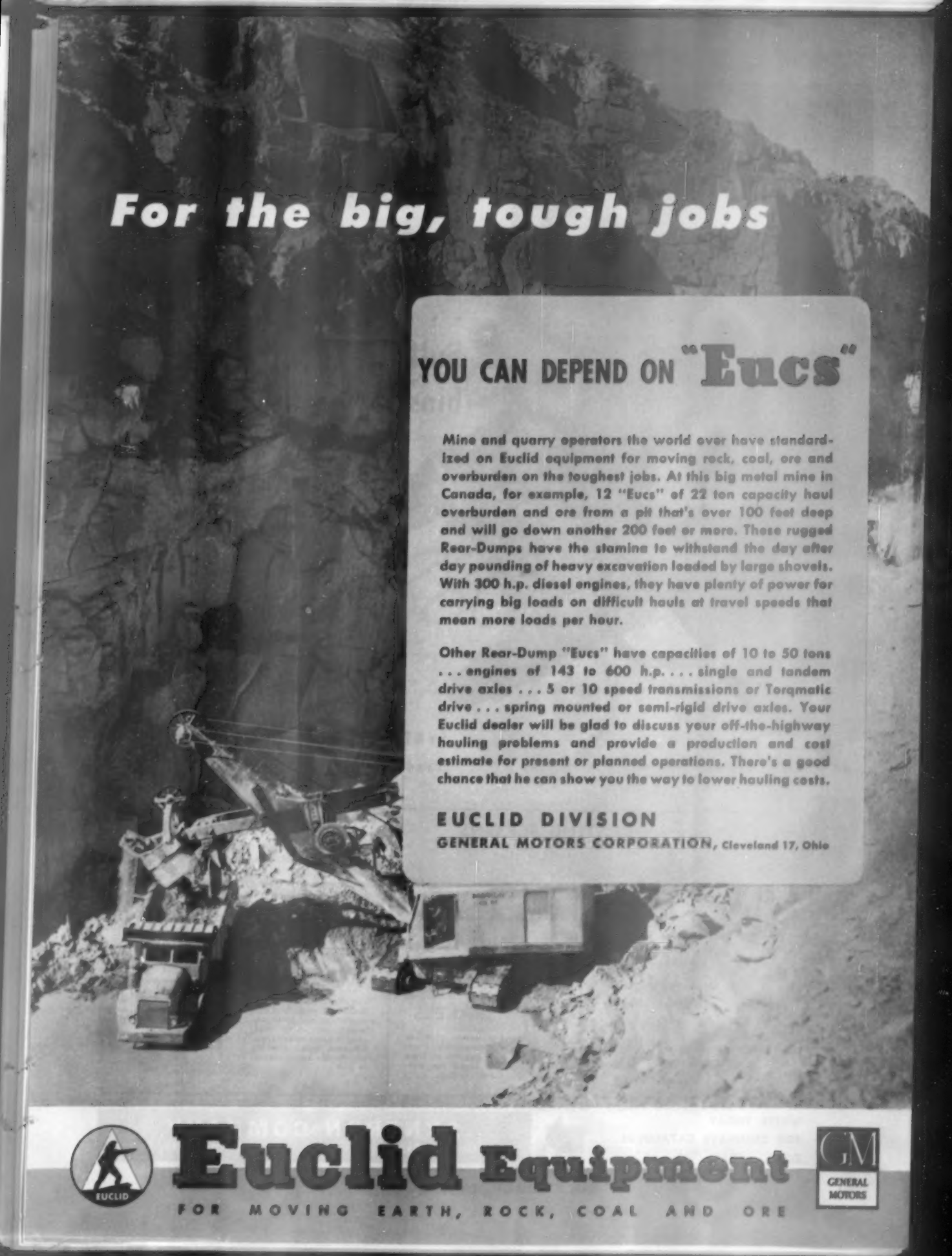
ESTABLISHED 1877

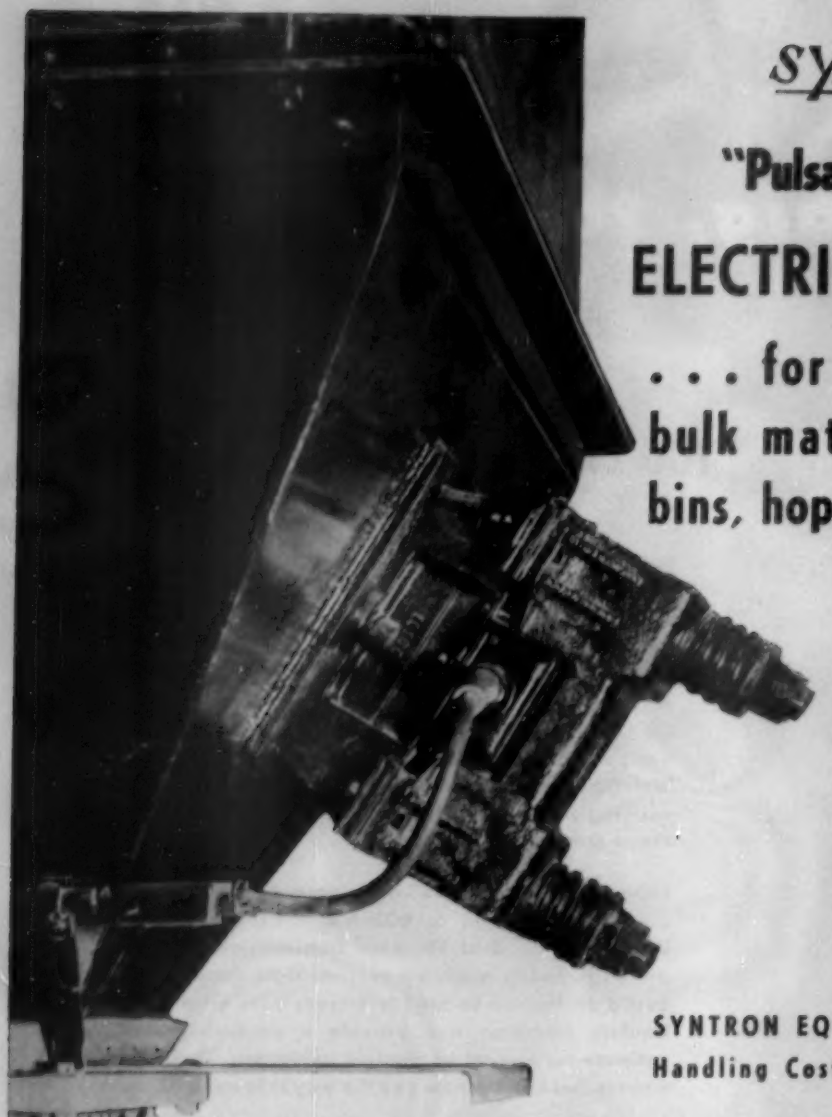
Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED . . . IT'S A JOB FOR JEFFREY!


For the big, tough jobs
YOU CAN DEPEND ON "Eucs"
Mine and quarry operators the world over have standardized on Euclid equipment for moving rock, coal, ore and overburden on the toughest jobs. At this big metal mine in Canada, for example, 12 "Eucs" of 22 ton capacity haul overburden and ore from a pit that's over 100 feet deep and will go down another 200 feet or more. These rugged Rear-Dumps have the stamina to withstand the day after day pounding of heavy excavation loaded by large shovels. With 300 h.p. diesel engines, they have plenty of power for carrying big loads on difficult hauls at travel speeds that mean more loads per hour.
Other Rear-Dump "Eucs" have capacities of 10 to 50 tons . . . engines of 143 to 600 h.p. . . . single and tandem drive axles . . . 5 or 10 speed transmissions or Torqmatic drive . . . spring mounted or semi-rigid drive axles. Your Euclid dealer will be glad to discuss your off-the-highway hauling problems and provide a production and cost estimate for present or planned operations. There's a good chance that he can show you the way to lower hauling costs.
EUCLID DIVISION
GENERAL MOTORS CORPORATION, Cleveland 17, Ohio
EUCLID
Euclid Equipment
FOR MOVING EARTH, ROCK, COAL AND ORE
GM
GENERAL MOTORS



SYNTRON

"Pulsating Magnet"

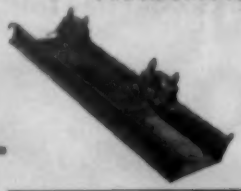
ELECTRIC VIBRATORS

. . . for a free flow of bulk materials through bins, hoppers and chutes

3600 controllable electromagnetic vibrations per minute prevent arching or plugging of the most stubborn bulk materials. Have no mechanical wearing parts that require maintenance. Compact—easy to install. Eliminate equipment damage from rodding, poking or sledging. In models and sizes for any bulk handling installation.

SYNTRON EQUIPMENT Reduces Handling Costs — Speeds Production

VIBRATING SCREENS



Heavy tonnage sizing and scalping. Replaceable screen surface, electromagnetic, finger-tip control.

VIBRATING GRIZZLIES

High speed, controllable feeding and scalping in one operation. Clean, low cost separation of materials.

2000 powerful blows per minute with automatic rotation of drill bit. Drills holes up to 2" in dia.

GASOLINE HAMMER Rock Drills

100% Self-Contained

TEST SIEVE SHAKERS

For quick, accurate sieve analysis. Positive control of time and speed for uniform testing.

WEIGH FEEDERS

For controlled, accurate feeding by weight. Load variations corrected automatically. Low cost, continuous operation. Efficient weigh feeding practically any material in bulk.

WRITE TODAY FOR COMPLETE CATALOGUE DATA — FREE

SYNTRON COMPANY

450 Lexington Avenue — Homer City, Penna.

New 30" x 26" Rolls

Greatest secondary crushing capacity ever offered in a plant of this weight

Giant Capacity

Gives you far more fine crushed material per hour. Has the ideal crusher for the big 4' x 12' screen

Universal 880 Senior "R"

10" x 36" Jaw • 30" x 26" Roll Crusher • 30" Conveyors • 48 sq. ft. Screen

You want a plant that delivers screened and crushed material at a record rate and produces it at lower cost per ton. This is it!

The 880 Senior "R" teams a huge 48 sq. ft. screen with the biggest roll crusher ever offered, big, rugged 30" conveyors and a high capacity 1036 jaw crusher to give you a plant unequalled for high production in its weight class.

It's easy and economical to operate, too. You can adjust the jaw discharge quickly while standing on the ground—insures full control over primary crushing at all times. Dual clutch control on delivery conveyor speeds up truck loading of finished material. Plant operator or truck driver can control conveyor discharge.

Add to this—trouble-free V-belt drive, head-drive front delivery conveyor, extended operator's platform, plus the dozens of other advanced Universal features . . . and you've got a big, profitable, easy-operating plant that can't be matched. Write for illustrated bulletin, today!

Universal Senior 880 "R"—designed to meet highway weight limitations

PETTIBONE UNIVERSAL
In Cedar Rapids Since 1906

UNIVERSAL ENGINEERING CORPORATION
617 C Avenue N.W., Cedar Rapids, Iowa
A Subsidiary of Pettibone Mulliken Corporation, 4700 W. Division St., Chicago 51, Illinois

MILL TEST PROVES LONGER LIFE FOR ABK® METAL

This photo, taken in a three-compartment grinding mill, shows at the top: ABK Metal liners installed in 1948; at bottom: the *second* set of steel liner plates installed since then. Both types of liners took the identical rough treatment. The ABK Metal liners are still in good condition. It is estimated that, before requiring replacement, the ABK Metal liners will give from 3 to 4 times the service that liners made of other materials will give.

This performance, in a major cement manufacturing plant, is typical of the longer life that can be expected from ABK Metal liners in all grinding operations . . . in primary, secondary or tertiary stages . . . wet or dry grinding . . . rough stone or finished products.

An exclusive product of American Brake Shoe, ABK Metal is a nickel-chrome iron of controlled structure . . . a metal with extreme hardness (500-700 Brinell, as required) and exceptionally high abrasion resistance.

Cut your replacement, maintenance and downtime costs, increase your mill's efficiency . . . specify ABK Metal next time you need metal liners. Consult us on your specific requirements.

AMERICAN Brake Shoe COMPANY

3345

BRAKE SHOE AND CASTINGS DIVISION

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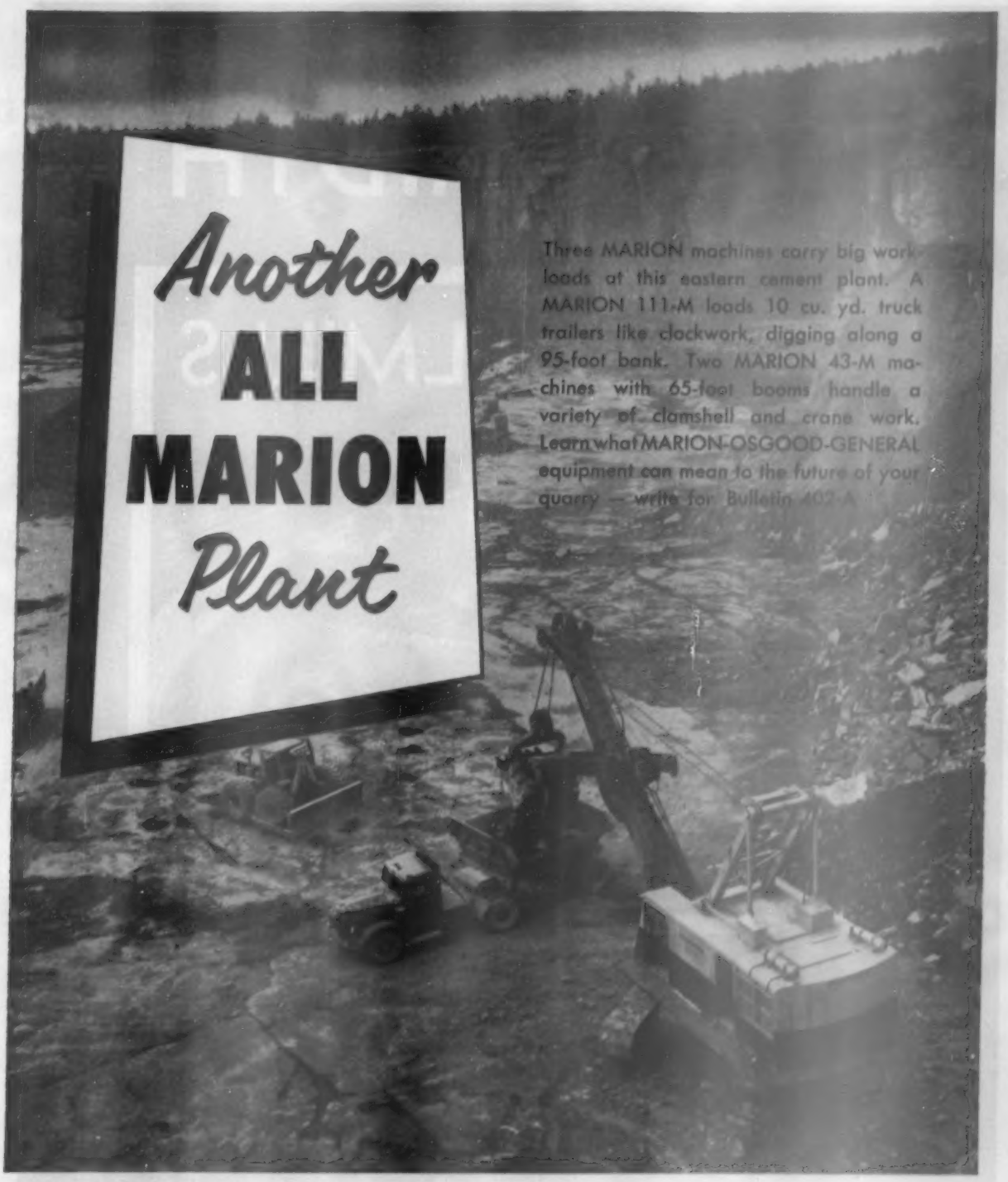
Another
ALL
MARION
Plant
Three MARION machines carry big work-loads at this eastern cement plant. A MARION 111-M loads 10 cu. yd. truck trailers like clockwork, digging along a 95-foot bank. Two MARION 43-M machines with 65-foot booms handle a variety of clamshell and crane work. Learn what MARION-OSGOOD-GENERAL equipment can mean to the future of your quarry — write for Bulletin 402-A

MARION / **MARION POWER SHOVEL COMPANY**
MARION, OHIO, U. S. A.

POWER SHOVELS FROM ½ TO 60 CUBIC YARDS • DRAGLINES • CLAMSHELLS • LOG LOADERS
PILE DRIVERS • WALKING DRAGLINES • CRANES, CRAWLER & RUBBER MOUNTED • BACKHOES

SMIDTH

BALLMILLS

WET OR DRY GRINDING

OPEN OR CLOSED CIRCUIT

ALSO AIR SWEPT FOR GRINDING AND DRYING

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What's Happening

IN OTHER FIELDS OF INTEREST TO THE ROCK PRODUCTS INDUSTRY

A dynamite bomb explosion damaged the central control room of the sulphuric acid plant at International Minerals and Chemical Corp.'s Bonnie phosphate chemicals plant at Bartow, Fla. The dynamiting took place on the 19th day of a strike by local 35 of the International Chemical Workers Union on which negotiations have been punctuated by other acts of violence. Portions of the plant continued in operation by members of the supervisory staff. Extent of the damage caused by the dynamiting is believed to be in excess of $50,000, and approximately two months may be needed to repair it. Temporary repairs, requiring a week to ten days were made so that the plant could be operated. Company officials offered a reward of $5000 for information leading to the arrest and conviction of persons responsible for the dynamiting.

Construction contract awards, in the 37 states east of the Rockies, totaled $14,254,308,000 for the first seven months of 1955, according to an F. W. Dodge report. This was an increase of 29 percent from 1954, setting a new high for that period. Seven-month totals were: nonresidential, $5,025,142,000, up 24 percent over the same period last year; residential, $6,415,750,000, up 36 percent; and public and private works and utilities, $2,813,416,000, up 22 percent. The July, 1955 figure for nonresidential building contracts was the third highest ever attained in this category, amounting to $892,629,000, up 39 percent from July, 1954. The July, 1955, residential total was $959,020,000, up 29 percent from July, 1955. Public and private works and utilities totaled $419,888,000, down 7 percent.

A shortage of gypsum lath and cement was recently reported near Columbus, Ohio. The gypsum lath shortage was attributed to a record housing program, and was aggravated by a strike at a major gypsum plant. Cement has been in short supply as a result of the Lockbourne Air Base project, new highways under construction, and a record building program. About 150,000 tons of cement are being imported from Germany to ease the shortage.

Rice hulls may be used as an aggregate for lightweight, low-cost brick, according to John H. Hough, assistant professor, Louisiana State University. The rice hulls, when burned, are said to become 94.5 percent silica. The ash flakes are porous and contain numerous nonconnecting cells which, it is claimed, make it a good insulator. It may also be valuable in defense against atomic attack, as it absorbs radiation.

Prefabricated reinforced concrete railway ties are being laid at various points of Israel's railway network. An order for 50,000 concrete ties has been placed by Israel Railways with the Yuval Gad Factory at Migdal Ashkelon. The ties are said to be 20 percent cheaper than wooden or steel ties used up to the present.

October, 1955

Technical information on uranium ore processing has been declassified by the United States Atomic Energy Commission. The declassification is aimed at encouraging private enterprise to participate in the Commission's raw materials program, and to develop cheaper and more efficient methods of processing uranium ores. The action does not include data on the refinement of uranium concentrates into highly purified forms, nor does it include data on any new and important extraction processes which may be developed. Unrefined uranium concentrates are produced in 12 processing plants in Colorado, Utah, New Mexico, Florida and Illinois. Four additional plants are being built, and all but one of the plants are privately owned and operated.

Mixtures of straw, sand and asphalt are being tested by the Iowa Highway Commission to control erosion along freshly graded stretches of highway. Straw and asphalt in emulsion form are sprayed along steep embankments and then sand and asphalt emulsion are sprayed over the same surface. Hardening or drying on the ground, the mixtures form a cobweb-like substance which is expected to prevent erosion or washing. However, the web has enough openings so that bluegrass, planted before the spraying is done, may grow through.

Thieves stole a heavy safe from the Borin Transit Mixed Concrete Co., Detroit, Mich. They dragged it through an office, across a yard, into a garage, and hoisted it into a company truck with a company crane. They used a crowbar to pry a chain off a gate and drove off. The safe contained an old, outdated deed to a house.

A polyethylene sheath was used as a transparent "raincoat" around a church which was constructed at Stamford, Conn. The sheath admitted light to the laborers and protected them from storms and cold. Besides preventing work interruptions during the winter, it also acted to keep the masonry from freezing.

Heavy construction awards, nationally, totaled $12,678,268,000 for the first 35 weeks of 1955, an increase of 30 percent over a year ago, and 12 percent higher than the previous record set in 1952, as reported in **Engineering News-Record.**

Plasterers in Santa Monica County, Calif., are contributing 1½ cents per hour for a public relations campaign aimed at pointing out the advantages of plaster over alternate materials. A total of $30,000 is expected to be contributed by the A.F. of L. local and county plastering contractors group.

An experimental tire has been developed jointly by United States Rubber Co. and Dow Corning Corp. The tire is manufactured from silicone rubber and glass fibers derived from sand and quartz, and is claimed to withstand temperatures of nearly 600 deg. F.

Another case reported of dynamite being stolen from a cement company serves as a warning to keep dynamite, fuses, etc. locked up.

THE EDITORS

A. P. Green

REFRACTORY PRODUCTS

SERVE THE WORLD'S INDUSTRIES

A Complete Line of Refractory Products for the Cement and Lime Industry . . .

80% ALUMINA

KRUZITE (70% Alumina)

MIZZOU (60% Alumina)

BIG CHIEF (50% Alumina)

KX-99

CLIPPER

A. P. GREEN HOT ZONE

EMPIRE

Your Assurance of Maximum Service at Lowest Cost . . . Regardless of the Operating Conditions in Your Plant

Like these contractors, you can

Bid lower- Finish jobs faster- make more per contract

SPECIFY GENERAL MOTORS DIESEL POWER

In <u>all</u> your construction equipment

"Works faster... burns less fuel... costs less to maintain."

That's what these contractors—operating *seven* different kinds of General Motors Diesel-powered equipment—report about their GM Diesels. They've got on-the-job proof that a GM 2-cycle Diesel does more work at less cost on every construction job.

If your business is building anything from sewers to skyscrapers, you'll find a good way to build your business is to *specify* a GM Diesel when you buy equipment.

For this quick-acting 2-cycle Diesel accelerates faster under load, burns fewer gallons of low-cost fuel, stands up better even in toughest working conditions. You won't need service often but, when you do, your GM Diesel distributor backs up engine performance with fast service and quick delivery of low-cost parts, no matter where your contracts take you.

Today you can get GM Diesel power in over 750 different models of equipment built by more than 150 different manufacturers. Get their names from your local GM Diesel distributor or write direct for the list.

25% MORE WORK AT HALF THE FUEL COST

California contractors McGuire & Hester report they're getting 25% more work—and spending 50% less for fuel—since they converted this ¼-yard dragline from *gasoline to General Motors Diesel power*. The compact "4-71" GM Diesel did such a good job that the contractor repowered two more shovels with GM Diesel.

GM
GENERAL MOTORS
DIESEL POWER

WORKS ⅓ FASTER—CUT FUEL COSTS 60%

Maryland contractor Charles F. Knox, Jr., reports he gets ⅓ more production, has cut fuel costs 60%, since he converted this ¾-yard shovel from *gasoline to GM Diesel power*. The shovel works 8 to 10 hours a day, costs far less to maintain. You can specify GM Diesel power in over 50 shovel models built by more than 20 manufacturers.

PAVES 1400 FEET A DAY

This Koehring Paver, powered by a compact, quick-accelerating GM 2-cycle Diesel, lays 1400 feet of 25-foot wide pavement per day for the Austin Road Company of Dallas, Texas. You can lay pavement faster and at less cost with GM Diesel power—available as original equipment in 8 paver models made by 4 different manufacturers.

"FASTEST DITCHER IN THE AREA"

McGuire & Hester *specified* GM Diesel power in two new Buckeye Ditchers and a Lorain Crane, as well as repowering a Hough Payloader, after getting *more work at less cost* with GM Diesel power in their dragline. The master mechanic calls this GM Diesel-powered Buckeye Ditcher "fastest in the area."

NO REPAIRS IN TWO YEARS

These GM Diesel-powered LeTourneau-Westinghouse Tournapulls worked over two years in flying abrasive dust without losing a day for repairs, reports Arizona contractor Link L. Colvin. In every kind of earth-moving equipment GM Diesel power lasts longer, works faster, costs less to run and maintain.

DETROIT DIESEL ENGINE DIVISION

GENERAL MOTORS • DETROIT 28, MICHIGAN

Single Engines . . . 30 to 300 H.P. • Multiple Units . . . Up to 893 H.P.

Where parts must be **EXTRA TOUGH**

. . . specify AMSCO® MANGANESE STEEL

Digging! Crushing! Handling! Amsco manganese steel parts work up to 10 times longer under punishment . . . because manganese steel can easily absorb heavy impact and abrasion. Hard work toughens the metal . . . it work hardens to as high as 550 Brinell. The pounding, grating action of rock and ore only polishes manganese steel.

To get maximum life out of your equipment, specify Amsco manganese steel parts from the manufacturer.

DIGGING—backhoe buckets • dippers and parts • repointers • dragline buckets and parts • dragline chain • sheaves • pinions • crawler shoes

CRUSHING—concaves • mantles • jaw plates • mill liners • hammers

HANDLING—bulldozer blades • tractor rollers, idlers • sprockets, grouser bars • truck beds • grizzle parts • ore car wheels and liners • sheaves, gears, pinions

Amsco also produces other alloy steels with maximum wear resistance under particular conditions of service . . . and a complete line of hardfacing equipment, both rods and machines.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

BONUS PRODUCTION

that's the reason for Commander popularity

Cedarapids

67% of owners report production exceeding expectations

50—1 of every 6 orders for Cedarapids equipment is for a COMMANDER

420 tons per hour producing 7/8" with 15 to 20% crushing . . . 400 tons per hour of 1¼" material with 12% crushing . . . 275 tons per hour of 1" material with 20% crushing! These are typical reports received from Cedarapids Commander owners all over the world. It is little wonder that it is the most popular aggregate producing plant with contractors and pit operators today.

Join the growing group of satisfied Commander owners. You will have a machine that was designed to meet the conditions of modern road building that call for higher percentage of crushing of pit material, finer aggregates and lower operating costs. See your Cedarapids distributor today for the complete story.

FEATURES THAT MEAN PROFITS FOR OWNERS

- ***New 30" x 25' Secondary Roll Crusher***
  This new roll crusher provides 12% more secondary crushing yet handles the same size feed. This new larger size balances the high screening capacity of the Commander's big screen.
- ***Large Horizontal Vibrating Screen***
  To handle the higher percentages of secondary crushing, the big 48" x 10' 2½-deck screen gives the Commander 30% more screening capacity than plants of comparable size. The Cedarapids Horizontal Vibrating screen provides most accurate grading and allows lower overall height.
- ***Efficient 10' x 36" Jaw Crusher***
  The high primary crushing output of this unit keeps the plant operating at peak capacity. Cedarapids Jaw Crushers are of a forced feed overhead eccentric shaft design engineered for extra-high capacity and low cost performance.
- ***Wide 30" Conveyors***
  Feed conveyor, delivery conveyors and under-crusher conveyor are extra wide to handle the greater capacity of the Commander. Channel conveyor frames combine light weight with exceptional strength.

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.

40 PAGES of helpful information

on Recovering Dusts, Fly Ash, Mists, Fumes and other Suspensions from Gases.

This booklet summarizes

the important points design and plant engineers should know about Cottrell Precipitators . . .

- Basic types of Cottrell equipment.
- Principal elements in a Cottrell unit.
- Data on Mechanical and Electronic Rectifiers.
- Various types of Collecting Electrodes (rod curtains, corrugated plates, pocket electrodes, etc.).
- Typical ways of removing collected material.
- Various Shell Constructions (steel, concrete, brick, etc.).
- The effect of various factors on efficiency and performance.
- Data on CMP (Combination Multiclone-Precipitator) Units.

. . . and many other helpful facts on Cottrell design and operation.

Latest data from Western Precipitation on Cottrell Recovery Equipment

Do you have operations in your plant where gas-laden suspensions, wet or dry, are a problem? Such suspensions may be dropping on surrounding property, causing nuisance difficulties. Or perhaps important values are being lost in stack gases that can be profitably recovered. Whatever the nature of your recovery requirements, you will find this 40-page Cottrell booklet of great help. It contains up-to-date data on the latest advancements in the electrical precipitation field – prepared by the organization that pioneered the commercial application of Cottrell Electrical Precipitators almost a half century ago and has consistently led in new Cottrell developments.

A copy of this data-packed booklet will be sent free to engineers and other executives interested in recovery processes. Send your request to our nearest office.

For nearly 50 years Western Precipitation has carried on a continuous research and development program on Cottrell Electrical Precipitators, Multiclone Mechanical Collectors and other types of recovery equipment. We are not affiliated with any other company in the electrical precipitation field except our wholly owned subsidiaries, International Precipitation Corporation and the Precipitation Company of Canada, Ltd. We are equipped to serve you anywhere in the United States, Canada, and throughout the world!

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PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

PHOTO COURTESY HARNISCHFEGER CORPORATION, MILWAUKEE, WISCONSIN

Flexibility of Modern Chrysler High-Speed Industrial Engines Proved in 375 Ampere Arc Welder

Here pictured in construction is a New York City garbage disposal dump located on the North River near 135th Street. When completed, trucks will drive up its ramps and discharge loads into cubicles located over scows. Scows will then convey refuse to a watery grave.

On this job, three P&H WN-302 Arc Welders have been putting in five 8-hour days every week welding cubicles, not only joining steel members but also giving them added strength for years to come. Chrysler Ind. 30 Engines power Harnischfeger 375 Amp. Welders supplying enough extra power to compensate for possible generator loss and still provide reserve for overload.

Within their 230 to 413 cubic inch displacement range, Chrysler Industrial Engines offer the high-speed performance construction equipment demands. Each engine is a compact, relatively small unit which will permit installation in virtually any type of construction equipment regardless of size or silhouette. Besides size, weight and cost advantages, should it become necessary, Chrysler Industrial Engines offer fast, easy parts replacement service with dealers located all over the country.

In considering power for your equipment, remember Chrysler offers its industrial engines built to meet the needs of the equipment with such items as gyrol Fluid Coupling; Chrysler Industrial Torque Converter; 3-, 4- or 5-speed transmissions; heavy-duty clutch and power takeoff; velocity, belt or gear-driven governors; gas, butane and propane burning carburetors available for factory installation.

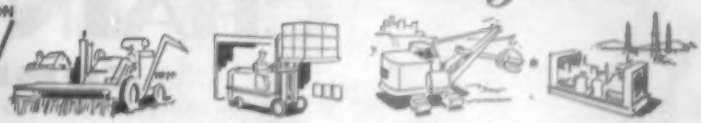
With Chrysler Power too, you do not pay a premium. Production-line methods adapted to specialized industrial engine building provide a custom-built Engine at mass-production prices. See a Chrysler Industrial Engine Dealer or write: ***Dept. 1410, Industrial Engine Division, Chrysler Corporation, Trenton, Michigan.***

CHRYSLER INDUSTRIAL 30 Engine
230 cubic inch displacement

CHRYSLER *Industrial Engines*

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

HORSEPOWER WITH A PEDIGREE



AGRICULTURE • INDUSTRY • CONSTRUCTION • OIL FIELDS

feed your conveyors RIGHT to control your processing!

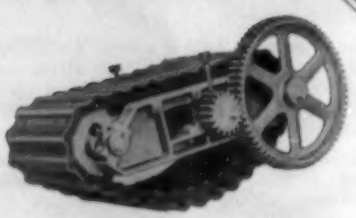
...with REX® Apron Feeders

When your conveyors are underfed, you're stepping up costs. You're not getting the capacity you've paid for... subsequent operations cannot be economically controlled!

When your conveyors are overfed, you're wasting money. Following plant operations are economically difficult to balance. And, the wasteful spillage causes unnecessary labor cleanup.

BUT, Rex Apron Feeders, provide the desired, metered rate for all following operations. Rex Apron Feeders are the key units in the close control of plant operations.

Why not have your Chain Belt District Sales Engineer look over your plant with a view to cutting handling costs. Call him or write Chain Belt Company, 4649 W. Greenfield Avenue, Milwaukee 1, Wis.



Typical Handling Operations Where Rex Apron Feeders Can Help Control Processing and Cut Costs

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- Ores
- Clinker
- Sinter
- Limestone
- Sand
- Cement Rock
- Heavy Chemicals

...and Rex Apron Feeders will handle these materials cold or hot (up to 1900° F.).

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Here's a balanced unit with stability and clearance. It reaches farther for loads . . . raises higher (10′ 4″) to clear truck sides. Roomy platform, handy controls and smooth steering—with two-track power—emphasize the OC-12's safe, easy operation. Let your Oliver Distributor show you the OC-12 in action. See why it's the capacity leader in its class.

Oliver OC-3 Tractor with 3WI Loader works anywhere. Eight attachments equip the loader for other jobs. Rear-mounted jet trencher can be used simultaneously.

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Report on the MICHIGAN TURBO-DOZER:

New dozer features 27 mph speed, power-tilting bowl, rear-wheel steer

The new 2¾ yd. capacity Michigan Turbo-Dozer combines rubber-tired speed and mobility with outstanding traction and power. Its turbocharged diesel engine develops 165 hp, with maximum rimpull of 28,000 lbs.—plenty of power for heavy dozing, push-loading and land clearing. At 27 mph, it runs rings around any dozer on the market!

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High flotation tires, oscillating axle. Big 18.00-25 low pressure tires (nearly 7-foot tread) give the Turbo-Dozer excellent ground contact in dry, wet or sandy footing. You can cross railroad tracks or travel along the ties or road bed; you can climb curbs and drive safely on any kind of road surface. On uneven terrain, the steering-drive axle oscillates to keep both rear wheels in firm contact with the ground. With 14½ inches of ground clearance underneath, it's practically impossible to get "hung up".

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Power-shifting, 300% torque multiplication. Clark's exclusive power-shift transmission eliminates the conventional engine clutch and foot pedal—the most notorious cause of excessive maintenance and operator fatigue. With two finger-tip levers on the steering column, the operator can instantly shift between High-Low and Forward-Reverse—even when moving in either direction.

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Prove it for yourself. The new Michigan Turbo-Dozer gives you faster cycles and more yardage in every shift—more dollars of profit every day. Ask your local Michigan distributor to prove it, with an on-the-job demonstration; or write direct for detailed specifications. The Turbo-Dozer is available on the low-cost Michigan Lease Plan: no down payment, pay as it produces!

MICHIGAN is a trade-mark of Clark Equipment Co.

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Construction Machinery Division
452 Second Street
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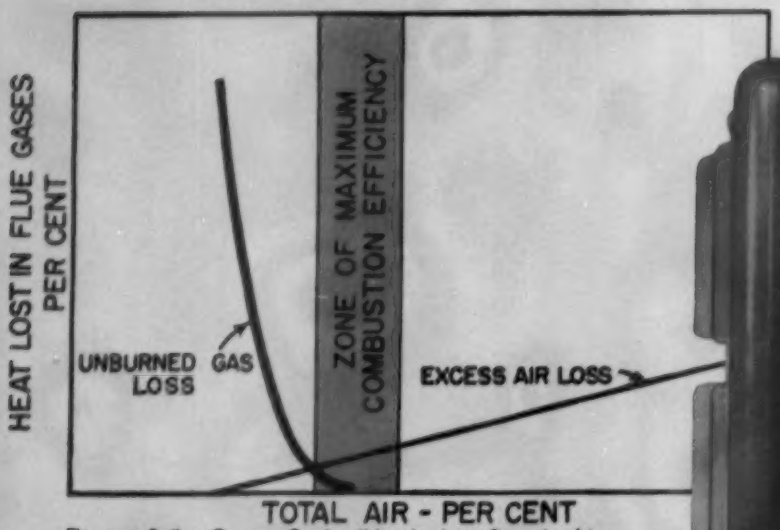

The new Bailey Oxygen-Combustibles Analyzer-Recorder (shown at right) provides a continuous two-in-one check of combustion efficiency by recording both oxygen and combustibles in flue gas. As shown by above chart, both measurements are needed to determine combustion efficiency.

BAILEY announces . . .
New 2 in 1 way to measure Combustion Efficiency

The new Bailey Oxygen-Combustibles Analyzer-Recorder gives you a continuing double check on combustion economy. It's fast response measures and records:

1. Excess air—regardless of the fuel or combinations of fuels being burned.

2. The mixing efficiency of your fuel-burning equipment—by indicating the amount of combustibles in your flue gas, resulting from incomplete mixing of fuel and air.

Combustion efficiency depends upon fuel-air ratio. Too much fuel can be even more costly than too much air. And because of the interdependence of these two factors, no control that measures only one of them can give you complete protection.

Now, for the first time, you can check *both* with a *single* fast acting instrument, using the new Bailey Oxygen-Combustibles Analyzer-Recorder for industrial furnaces, kilns, heaters and boilers.

Fuel economy improves as excess air is reduced —until unburned fuel begins to show up in the flue gas. When this happens, combustion efficiency drops off sharply if there are further decreases in the air-fuel ratio. That's why combustion gases must be analyzed for *both* oxygen and combustibles to get a true indication of efficiency—and that is why Bailey coordinates both measurements on the same chart, to show when excess air may be reduced safely without danger of greater losses from unburned gases.

The Bailey Oxygen-Combustibles Analyzer is an approved combustion safeguard.

Ask your local Bailey engineer for suggestions on application. Equipment details in Product Specifications E65-1 and E12-5. P31-1

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Expansion planning differs from plant to plant. In some operations, meeting increased capacity requirements calls for complete replacement of out-moded equipment.

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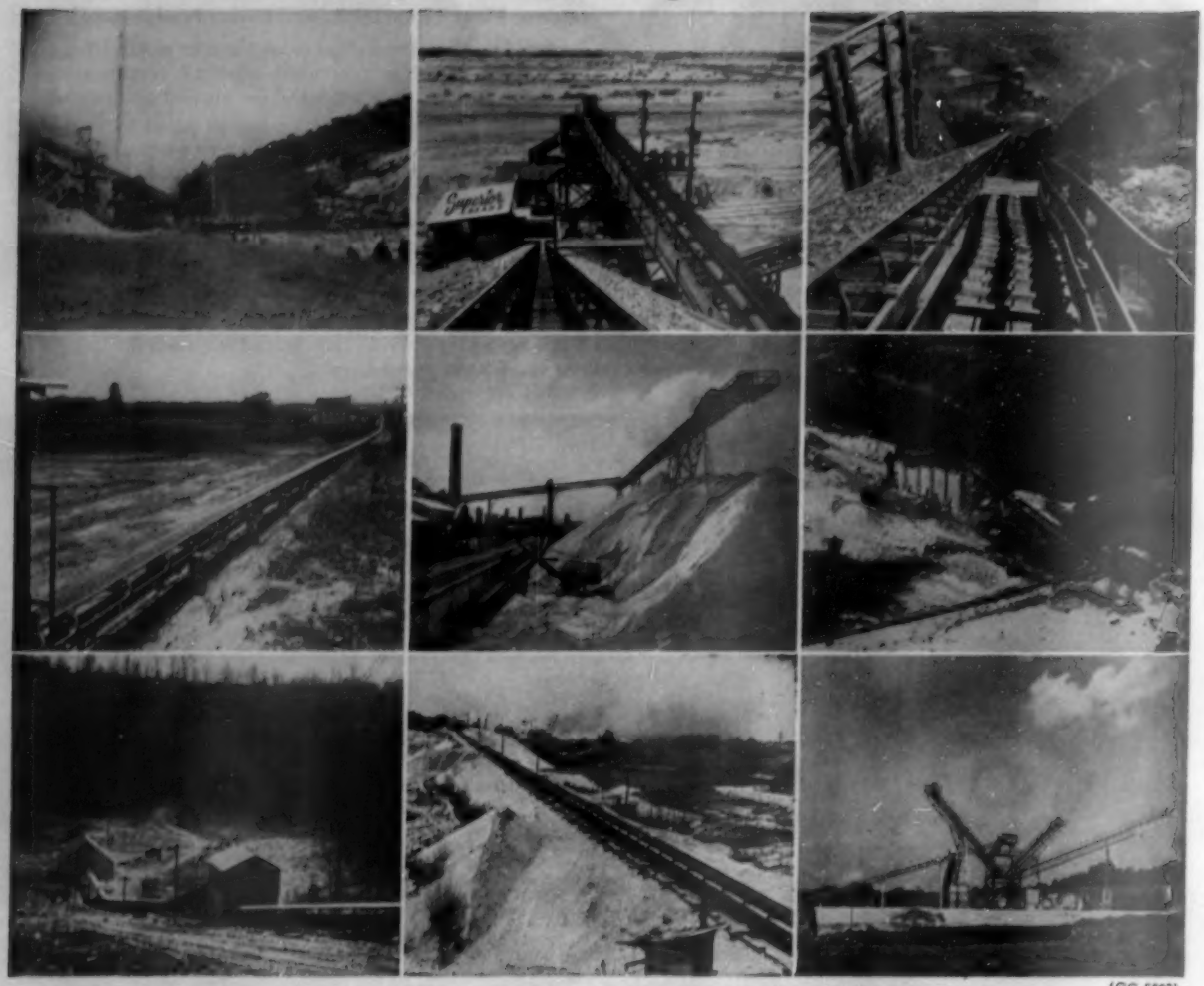

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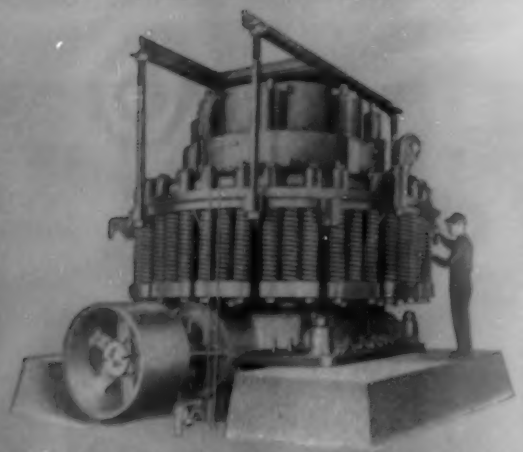

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Write for literature on the machinery you need.

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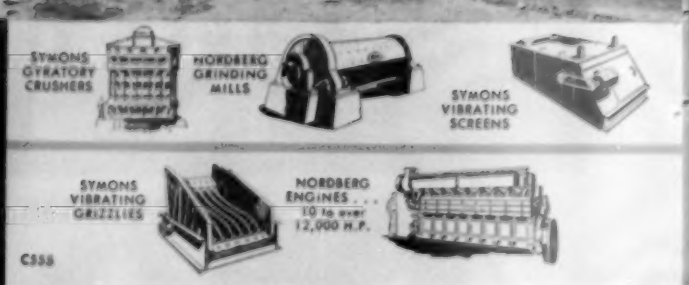
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Large grease reservoirs
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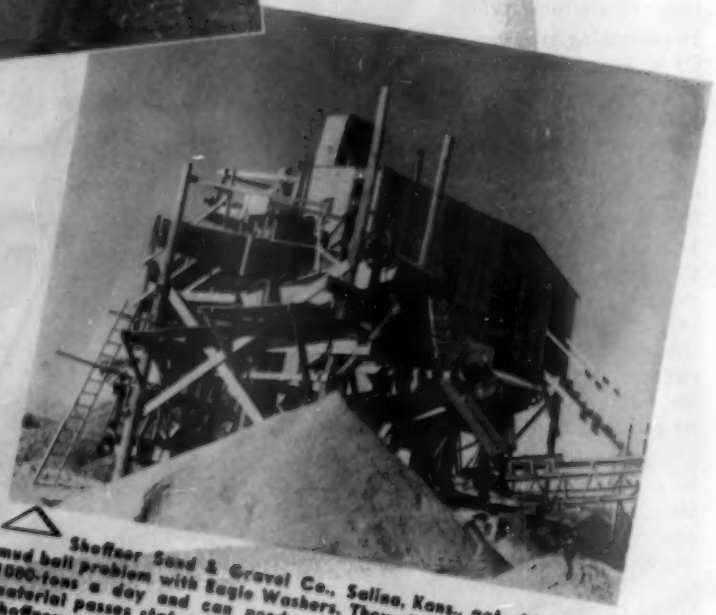

Shoffner Sand & Gravel Co., Salina, Kans., got rid of the mud ball problem with Eagle Washers. They state, "We can handle 1000-tons a day and can produce what the public wants." All material passes state specifications with plenty of minus 50 mesh. Shoffner operates 8 Eagle units at various plants.

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EDITOR'S PAGE

Signs Grow that Railroads Intend to Meet Competition

AMERICAN RAILROADS are starting to get excited about their loss of traffic to the trucking industry. The percentage of intercity freight hauled by trucks has been steadily climbing, to prove there was a limit on how high freight rates could be pushed.

This trend applies to the aggregates industries among others and associations of these industries have repeatedly cautioned the railroads that they were going too far in their efforts to pile on one freight rate increase after another.

Warnings that traffic would be increasingly lost to truckers were not sufficiently heeded and the railroads have lost many millions of tons of revenue annually from aggregates alone. They stand to lose much more available volume with rising demand for these materials.

For all forms of intercity freight traffic, the decline has been from about sixty-two percent by rail in 1939 to forty-nine percent in 1954.

A similar situation has existed in Canada but increasing use of a system of "agreed charges" to regain traffic lost to truckers is bringing substantial business back to the rail carriers in the transport of many commodities. American railroads are studying the system.

Plans to Cut Rates

An "agreed charge" is a form of volume discount which Canadian railroads may apply in cases where they can show they are losing traffic to competition. They are allowed to offer shippers substantial rate cuts if they can prove that such rate cuts are necessary to get the business and are only to win traffic from competition.

The system is contingent on shippers signing contracts to route a substantial portion of the involved traffic by rail for at least a year. In contracts so far drawn, the volume of rail traffic agreed to ranges from more than fifty percent up to all of the product involved. Amount of the rate cuts varies with the percentage of traffic agreed upon and ranges up to sixty percent.

Agreed charges have been applied so far to canned goods, soap, lard, butter and other commodities and there will be more. The result is that truckers have lost out on many hauls and the railroads have gained millions of dollars in business.

It has been proved by this record that railroads can often make very substantial cuts in rates to add more business and make a profit, sometimes more than before, due to the increased income and operating savings because of higher guaranteed volume of business. American railroads are studying the plan due to the favorable experience.

More freedom for rate-cutting is now under consideration at the federal level in the United States and railroads may well push for tied-in contracts of the Canadian type. Opponents of such plans believe them to be unworkable and illegal. Changes in the Interstate Commerce Act may be involved. Whereas shippers may endorse the idea, there are those shippers using rails all along who may consider rate-cutting practices unfair because new competition is thereby introduced. Guaranteeing shipments to the railroads has its dangers. Should there be deterioration of rail service, as there is now with acute shortages of gondolas, hopper cars and box cars, a shipper guaranteeing to ship the bulk of his materials by rail would be hard hit.

High Rates Hurt Carriers

This interest by the railroads in ways to regain traffic is significant. Should any leeway for rate cuts be granted, it would have a considerable economic effect, involving the carriers, truckers, shippers and consumers. Such action, if it involve low-cost bulk commodities like crushed stone and sand and gravel, might have very significant results. These materials carry freight rates averaging more than the price of the product at the plant and thus are very sensitive to freight rate changes.

Aggregates are the lowest grade commodity in commerce, according to price. There is keen competition among aggregates producers who are selling materials valued at slightly more than one dollar per ton at the plant. Materials of the industry are generally available and short distances are involved in marketing. The very nature of these industries, thus, shows a need for the lowest possible freight rates.

These points have been brought to the attention of the railroads time and again as carriers sought to impose added rate hikes to penalize the permanent plant producer. Arguments along these lines and warnings that rail carriers would lose ground through diversion to other forms of transportation have meant little.

With every rate increase, have come more wayside and temporary operations set up for truck transportation. Transportation costs have also been the economic factor in establishment of government and other non-commercial operations because consumers want to get materials—not pay higher delivery charges—for their money.

The last rate increase resulted in loss of more than four million tons of crushed stone traffic to the railroads alone. Maybe the trend is starting to drive home.

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Poison in the Concrete Soup?

ROCKY'S NOTES

NATHAN C. ROCKWOOD

CONSTRUCTION INDUSTRY, as represented by engineers who write specifications, has come to look upon alkalies in portland cement as poison. Any siliceous aggregate, so far as anybody knows, *may* react with alkali in the course of time; and since siliceous aggregates are hard to avoid, the specification writers would eliminate alkali as a cement ingredient. Fortunately or unfortunately, this is not feasible, and engineers continue to worry whether a limit of 0.6 percent alkali is a low enough limit.

We have a hunch that the day is not far distant when researchers, and others who have some knowledge of how to make durable concrete, will be wondering why this generation of ours missed the boat. It appears on the threshold of a discovery that could greatly enhance the durability of concrete, yet is taking a pessimistic view of the discovery and worrying about ways and means of preventing cement-aggregate reaction, when they might rather be looking for ways to promote such reactions that may prove to be favorable.

In our summary in the August issue of the recent P.C.A. Bulletin by T. C. Powers and H. H. Steinour on "An Interpretation of Some Published Researches on the Alkali-Aggregate Reaction," we suggested that a logical inference might be drawn that portland cement concrete could be improved by both *more alkali* and more reactive silica, or pozzolan. The authors conclude that when both lime (or calcium) and alkali (sodium or potassium) are available to reactive silica (silica gel) a non-expanding complex gel (containing both calcium and alkali) is formed and injected by the pressure generated into the capillaries and pores of the cement and concrete. Obviously, this must increase its density, and reduce its permeability, and very likely improve its strength and durability.

That something of the same idea has occurred to others who have done some serious thinking about the inconsistencies in concrete experimentation and construction experience is evidenced by a letter from Bryant Mather, calling our attention to some remarks of his on p. 990 of the *Proceedings* of the American Society for Testing Materials, Vol. 53, 1953. Mr. Mather is engineer, Concrete Research Division, Waterways Experiment Station, Corps of Engineers, Jackson, Miss. He was discussing a paper by William Lerch, P. C. A., on the "Significance of Tests for Chemical Reactions of Aggregates in Concrete."

Helpful Aggregate Reaction

Mr. Lerch introduced his paper with this sentence: "The bond between the aggregate and the matrix has a significant effect on the strength, permeability, and durability of concrete. It is probable that the bond is affected by chemical reactions at the surface of the aggregate, and by the surface texture or other characteristics of the aggregate. * * * * The entire problem of the chemical and physical factors that influence the bond between aggregate and matrix is one that deserves further study." The rest of the paper was concerned entirely with "deleterious" chemical reactions—alkali-aggregate reactions.

In his discussion of the paper, Mr. Mather said: "Mr. Lerch made reference to beneficial and deleterious reactions, and in a later part of his paper he made reference to deleterious and innocuous aggregates. The point that I would like to make is, that we need more information about discriminating between beneficial, innocuous, and deleterious reactions and aggregates.

"At the present time we can only classify the reactions with which we are dealing and the aggregates in which we are interested, in terms of their behavior in concrete. If the concrete is harmed by the presence of the aggregate or by the fact that a given reaction took place, then the aggregate is deleterious and the reaction is deleterious.

"I think, however, that it may very well be that a particular chemical reaction involving a particular class of aggregate may, if it goes on to a limited extent, be beneficial; but if that same reaction, involving those same aggregates, goes further, it may be deleterious. I suggest this, because there are certain preliminary observations that we have made in our laboratory which makes me suspect that this may be the case.

"I rather hesitate to be specific, but in order to give an example of the sort of thing that I am speaking of, I would like to mention the chalcedonic chert aggregates of the Gulf Coast, particularly as they occur in parts of Mississippi, Alabama, Louisiana, and Texas. The quick chemical tests involving the determination of solubility and reduction of alkalinity in sodium hydroxide indicate that these aggregates are almost uniformly "deleterious." Mortar-bar tests often indicate abnormal expansion. There are, however, very few service records which indicate that concrete made with these aggregates, even with high alkali cements, has given trouble in service.

"Examination of samples of this concrete indicates that the expected chemical reaction has taken place, but, and this appears to be characteristic, the typical alkali-aggregate reaction in those particular concretes seems to have been beneficial. Mr. Lerch, at the outset of his paper, spoke of the beneficial reaction which improves the bond between the aggregate and the matrix. There are indications that the alkali-aggregate reaction, if it goes only so far, but not too far, does just that. I suggest therefore, that we must consider these things in terms of degree, as well as of kind, when we separate the beneficial from the deleterious, and the innocuous from the deleterious, when we classify both reactions and aggregates."

Alkalies Helpful?

That is a cautious suggestion that alkalies, in moderation at least, may be good for some concrete made of reactive siliceous aggregates. We had that same idea as far back as December 1948, when on this page we suggested "Back-Tracking May Help Solve a Problem." There we referred to a possibly or probably helpful function of alkalies in concrete by abstracting an article in *Engineering News*, June 19, 1913, by R. R. Coghlan, on "Blended or Sand-Cements; Results of Study and Experience of the U. S. Reclamation Service," Mr. Coghlan was then "manufacturing chemist," for the Reclamation Service, at the grinding plant erected in connection with the construction of the Elephant Butte, N. M., dam.

Now the Elephant Butte dam is one of two (the other Arrow Rock) of which the Reclamation Service is most proud, for they are obviously made of

(Continued on page 144)

CATERPILLAR ANNOUNCES

A NEW LINE OF PORTABLE ELECTRIC SETS

Dependable electric power—where it's needed, when it's needed

USE CAT PORTABLE ELECTRIC SETS

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LABOR RELATIONS TRENDS

By NATHAN C. ROCKWOOD

Damage Suit Against Union for Delaying Construction Work

PROBABLY MOST EMPLOYERS feel that labor union responsibility has not kept pace with increase in organized labor's economic power, and the obvious abuse of such power in many instances. Therefore, it must provide some satisfaction to know of at least one instance where the arrogant and illegal acts of a labor union boss, which interfered with the peaceful relations between a construction contractor and his employes, seriously delaying accomplishment of his work, has been held by the Supreme Court of Colorado, a tort for which the employer is entitled to collect at least $26,000 in damage claims.

The case in point was that of the Denver (Colo.) Building and Construction Trades Council, et al. v. Shore. The decision was rendered August 2, 1955, having been in the courts, and before the National Labor Relations Board for several years. The Denver Building and Construction Trades Council, readers of this page will recall, has been a frequent trouble maker, guilty of secondary boycotts, etc. For once, anyhow, it has been set back on its heels, and it is to be hoped, both it and similar organizations will have learned something from the experience. What follows are extracts from the court's decision, abbreviated in some instances to save space.

Details of Dispute

"The controversy arose in Arapahoe county where plaintiff, under contract with the State Highway Department, was engaged in the construction of a highway project on Cherry Creek. In this work he employed both union and nonunion men, those engaged in the operation of the heavy construction machinery being members of the Engineers Union and receiving wages in accordance with the wage scale of that union; unskilled men and others not members of the union were not being paid union scale wages but were receiving pay substantially over that provided by the contract entered into between plaintiff and the State Highway Department. The work was progressing harmoniously with no contention or dispute between plaintiff and any of his employes over wages, working conditions or otherwise, until the situation hereinafter detailed arose through the intervention of a representative of the Denver Trades Council, found by the trial court to be an association of and agent for 24 labor unions in Denver and vicinity engaging in the construction business, including the defendants Iron Workers Union and Engineers Union.

"The trial court further found, and its findings are amply supported by the record, that on the evening of August 15, 1948, a representative of the Denver Trades Council demanded of plaintiff that he employ union labor exclusively on said state highway project to make the job 100 percent union, and to assign the work of laying and tying steel in forms for the construction of a bridge, a part of said project, to members of the Iron Workers Union instead of having said work done by unskilled labor, and declared to plaintiff that if these demands were not acceded to and put into effect by the following morning, union pickets would be placed on said project; that the plaintiff refused to agree to said demands and that pickets were so placed on the project on the following morning; that common laborers and carpenters immediately left the job but shortly thereafter returned; that members of the Engineers Union immediately quit work on learning of said picket line and thereafter continuously refused to man the machines employed on that contract although some of them later accepted similar assignment from plaintiff on work he was doing disconnected from that particular construction project; that aside from two members of said engineers union, plaintiff thereafter could procure no other skilled and efficient operators to man said machines and for that reason the work on said construction project was for a time seriously impeded and later considerably slowed down throughout the period that said picket line was maintained. The trial court further found that said cessation of work by the defendant Engineers Union was the result of the concerted action of the defendants and their agents and representatives and that said defendants had engaged in conduct which constituted an unfair and unlawful labor practice under the Colorado Labor Peace Act; that said defendants undertook to cause the plaintiff, as employer, to discriminate against employes who are not members of the union in an attempt to force plaintiff to employ union labor exclusively and to impel all of his employes to join a labor union; have attempted to coerce the plaintiff into assigning the laying and tying of steel in the forms for the bridge construction to the members of a particular union rather than to employes of some other classification; all of which have caused and is causing plaintiff substantial damage and delay in going forward with his work in pursuance of his contract. The trial court further found that although the picketing referred to had been conducted in a peaceful manner, that it was for an unlawful purpose and in an attempt to force the plaintiff to engage in labor practices to which, if he had acceded, would have caused him to violate the Colorado Labor Peace Act, and that all of said mentioned acts of defendants were and are violative of the provisions of said Act.

"The findings of the trial court above referred to were entered by said court when, following extensive hearings, it directed the issuance of a permanent injunction against defendants on October 11, 1948.

"The case has been before us on two previous occasions, the first being upon writ of error to review the granting of the injunction above mentioned, the second occasion being on procedural matters. Upon remand following our last review pertaining to procedure the trial court adopted its findings and conclusions entered at the time of the granting of the injunction wherein it found the defendants to have been in violation of the provisions of the Colorado Labor Peace Act and added thereto only a general finding in favor of plaintiff and against the defendants on all issues, fixing the damages to be awarded plaintiff in the sum of $26,000 together with the further sum of $8,428.25 in lieu of interest on said $26,000 at the rate of 6 percent per annum from October 22, 1948, and the further sum of $3,250 as attorneys' fees, and directed judgment accordingly. In our consideration of the present issues we have found it necessary to study the entire record, not only in this case, but also as made in the two preceding cases above mentioned.

Union's Argument

"In their summary of argument,

(Continued on page 148)

as modern as they come...

DESIGNED AND EQUIPPED BY TELSMITH

New Plant of L. Romano Construction Co., East Providence, Rhode Island, processes 200 tons per hour of washed aggregate—sand, and 3 sizes of gravel all under 1½" and stockpiled. Telsmith designed the plant, and built the machinery. Send for Telsmith Complete Plant Service Bulletin 278.

Crushing Plant (*above*)—Plus 4" gravel goes to a 18" x 32" Telsmith Jaw; plus 1½" gravel to a 36-S Gyrasphere Crusher; the scalper is a 4' x 12' Telsmith 2-deck Vibro-King. **Washing Plant** (*right*) has a 72" Telsmith Super-Scrubber; two 4' x 12' Telsmith 2-deck Vibro-King rinsing-sizing screens; 24" x 20' Telsmith Twin Screw Sand Classifier.

Many Features of Modern Design—In this plant both Telsmith Crushers are high capacity, low maintenance machines. The large-capacity Telsmith sizing screens have spray bars on every deck. The extra heavy-duty Telsmith Super-Scrubber takes out the clay as well as soft stone, assuring top quality aggregate always. Send for Telsmith Bulletin 266.

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PEOPLE

IN THE NEWS

T. J. McCarthy Retires

TIMOTHY J. MCCARTHY, manager of the Blair limestone division, Martinsburg and Millville, W. Va., of Jones & Laughlin Steel Corp., Pittsburgh, Penn., has retired after 51 years' experience in the quarrying of limestone, 30 of which were served with J & L. Born in Colliers, W. Va., Mr. McCarthy was educated in Logansport, Ind.; Sandusky, Ohio; and Fairmount, Ill. He began his limestone quarrying career at the age of 15 as a tool clerk at the Casparis Stone Co., Logansport, and advanced to superintendent of the company.

In 1925, Mr. McCarthy joined the Anna Stone Co., Anna, Ill., where he served as superintendent. That same year he was appointed superintendent of the Blairfour, Penn., quarry and crushing plant of the Blair Limestone Co., a J & L subsidiary that became a division in 1948. In 1929 he was made general superintendent of the Blair Limestone Co. and in 1951 became manager of the Blair limestone division.

Riverton Officials

HAROLD W. SMITH has retired as vice-president of operations of the Riverton Lime and Stone Co., Inc., Riverton, Va., and will be succeeded by

Herbert W. Rich

Herbert W. Rich, formerly vice-president of operations of the Dominion division, Piney River, Va. Arthur B. Nunn, Jr., formerly assistant to Mr. Smith, has been appointed superintendent of the Riverton plant, and William L. Stagg, III, who served as assistant to Mr. Rich, becomes superintendent of the Dominion division.

N.L.A. Highway Engineer

CONARD M. KELLEY, formerly in charge of the Dallas district laboratory of the Texas Highway Department, has joined the National Lime Association as highway engineer, with headquarters in Garland, Texas. In his new capacity Mr. Kelley will provide technical information and service to highway engineers on lime stabilization of road bases and sub-bases. He has supervised construction and reconstruction of lime stabilized roads throughout military bases and camps in the southwestern states and, more recently, has supervised laboratory testing of lime-soil mixtures with the Texas Highway Department in Dallas.

Ideal Cement Directors

J. A. MCCARTHY, vice-chairman and a director of Ideal Cement Co., Denver, Colo., has retired and will be succeeded on the board by D. J. McGanney, vice-president of the Southern Pacific Co. Mr. McCarthy has been active in the cement industry on the Pacific Coast since 1916, having been one of the founders of the Old Mission Portland Cement Co. at San Juan Bautista, Calif. He became president of Pacific Portland Cement Co., which included Old Mission and Beaver Portland Cement Co., in 1939, and was

Harold W. Smith

Arthur B. Nunn, Jr.

William L. Stagg, III

elected vice-chairman and a director of Ideal Cement Co. in 1952. Mr. McGanney, a native of California, joined the staff of Southern Pacific Co. in 1911, and it was at Mr. McCarthy's suggestion that he was invited to fill the vacancy on the board of directors.

National Gypsum Managers

WADE W. HILDINGER has been appointed director of general sales, National Gypsum Co., Buffalo, N. Y. He

Wade W. Hildinger

was formerly general sales manager and will be succeeded in this position by Melvin F. Cerruti, who has been serving as eastern division sales manager, New York City.

Mr. Hildinger joined the company in 1942. Six years ago he transferred to Buffalo from Dallas, Texas, where he had served as general line salesman and later as district manager. Subsequently he became director of trade relations, assistant general sales manager, and general sales manager. Born

Melvin F. Cerruti

in Nash, Okla., Mr. Hildinger was graduated from Phillips University, Enid, Okla., and later studied at Harvard University's Business School.

Mr. Cerruti, a native of Northampton, Mass., became associated with National Gypsum Co. in 1927.

Donates Prize Steer to Children's Home

FREDERICK W. REINHOLD, president, Anchor Concrete Products, Inc., Buffalo, N. Y., purchased the grand champion steer of the Erie County, New York, Fair, and donated it to the Methodist Home for Children at Williamsville, N. Y. The 792-lb. Angus steer, owned and raised by David Taylor, Lawtons, N. Y., was purchased by Mr. Reinhold for $1029.60, an all-time high in the 9-year history of the

Frederick W. Reinhold and David Taylor with grand champion steer at Erie County, New York, Fair

annual 4-H Baby-Beef Show. The money will be used by the young man for his college education.

Returns from World Tour

ARTHUR C. AVRIL, president, Sakrete, Inc., Cincinnati, Ohio, and Mrs. Avril, recently returned from a three-month trip around the world, during which he talked to businessmen from Honolulu to Rome. Purpose of the trip was to determine new plant possibilities for the manufacture of Sakrete. As a result of his trip, Mr. Avril has licensed three new Sakrete plants to be built in Sydney, Melbourne and Adelaide, Australia.

Leaves Lime Association

GLADYS L. MCBEE has resigned as secretary of the National Lime Association, Washington, D. C., and will make her home in Denver, Colo. She has been with the association since 1946 and during these years attended practically every meeting, making many friends among the lime companies. Her new address is Apartment 314, 930 Downing St., Denver 18, Colo. Georgia M. Coffman was elected assistant secretary at the N.L.A. meeting at Hot Springs, Va., in May, 1955, and is taking Miss McBee's former position.

Marquette Superintendent

J. M. DOWDY has returned as superintendent of the Superior, Ohio, plant of Marquette Cement Manufacturing Co., Chicago, Ill., according to an announcement by Frank Moyle, vice-president and director of operations. Mr. Dowdy has been on special assignment at the Oglesby, Ill., plant. Henry L. Restarick, acting superintendent at Superior, has been named superintendent at the Rockmart, Ga., plant, and J. C. Bennet, who has been acting superintendent at Rockmart, returns to his duties on the technical staff in Chicago.

American-Marietta Officers

R. L. TROXELL has been elected a vice-president of American-Marietta Co., Chicago, Ill., in addition to his duties as chief engineer. The engineering department has been subdivided into three divisions, with Robert Wolf as senior engineer in charge of architectural and structural engineering, John Baggott as senior engineer in charge of mechanical and electrical engineering, and Lewis C. Knight as senior engineer in charge of process and materials handling engineering.

Smithwick Promotions

CARLETON G. SMITHWICK has been elected executive vice-president of Smithwick Concrete Products, Portland, Ore. He was formerly production manager. Paul L. Nutt, sales manager, who has been with the company since it was founded in 1946, has been appointed vice-president, and Robert B. Clarke, formerly a salesman, has been promoted to assistant

Dwight G. DeHaven

Left to right: Robert B. Clarke, Carleton G. Smithwick and Paul L. Nutt

sales manager and a member of the board of directors. Dwight G. DeHaven, general manager of the Eugene division serving southwestern Oregon, has been named vice-president.

Columbia Cement Engineers

PAUL DAVIS has been appointed plant engineer at the East Fultonham, Ohio, plant of the Columbia cement division of Pittsburgh Plate Glass Co., Pittsburgh, Penn. He joined the engineering staff in 1946 as a civil engineer and in his new capacity will be responsible for all engineering problems in connection with the plant, quarry and mine. He is a graduate of Ohio University, Athens, Ohio, where he received his degree in civil engineering.

August Meinrath, a graduate of the University of Texas, Austin, Texas, with a degree in chemical engineering, has been appointed project engineer at the East Fultonham plant. He was formerly assistant superintendent of production at the Corpus Christi plant of Columbia-Southern Chemical Corp., a division of Pittsburgh Plate Glass Co.

Lewis Re-elected President

CHARLES F. LEWIS has been re-elected president of the Volunteer Portland Cement Co., Knoxville, Tenn. E. Earl Evans was re-elected vice-president and general manager, and John Hanahan, secretary and assistant treasurer. Mr. Lewis became president of the firm in 1954 to succeed J. R. Hanahan, who was then named chairman of the board.

Chairman of the Board

G. S. THORVALDSON has been appointed chairman of the board of Western Gypsum Products Limited, Winnipeg, Canada, and W. M. Torgerson, general manager, and R. C. Blair, production manager, have been appointed directors. Western Gypsum Products Limited, with plants at Winnipeg and Calgary, a gypsum mine at Amoranth, Manitoba, and mining properties in British Columbia, was purchased by the British Plaster Board (Holdings) Ltd., in February of this year.

Joins Crushed Stone Firm

COL. HARRY H. HAAS has been appointed vice-president of the Buffalo Crushed Stone Corp., Buffalo, N. Y., a subsidiary of Frontier Industries, Inc. Owner and a member of the board of directors of Nustone Products Corp., Tenafly, N. J., Col. Haas has been engaged in the manufacture of concrete products for 18 years. For the past three years he has been in charge of procurement and production in the office of the assistant secretary of defense for international security affairs.

Sales Director

CURTIS L. WILLMOTT, vice-president of McDowell Co., Inc., Cleveland, Ohio, contractors for cement and crushed stone plants, has been named sales director for McDowell Co., Wellman Engineering Co. and the Williams bucket division, Akron; Locomotive crane division, Cleveland; Dwight-Lloyd division, Cleveland; and the Anker-Holth division, Port Huron, Mich. Mr. Willmott has also been elected a director of Wellman Engineering Co., and John J. McGlone has been appointed sales manager of the Williams bucket division.

Joins Slag Association

D. W. LEWIS has joined the National Slag Association as chief engineer. He was formerly research engineer, Indiana Joint Highway Research Project, and associate professor of highway engineering, Purdue University, where he was engaged in the field of aggregate and concrete research. He is a member of the American Concrete Institute, American Society for Testing Materials, Highway Research Board, and the American Society of Civil Engineers. As chief engineer of the National Slag Association, Mr. Lewis will work closely with E. W. Bauman, managing director, on engineering matters pertaining to slag as a mineral aggregate and its end uses. He will continue to serve on technical committees as a representative of the slag industry.

D. W. Lewis

President of North American

ALBERT M. ANDREAS has been elected president of North American Cement Corp., New York, N. Y., in addition to serving as chairman of the board. He succeeds Thomas J. Harte who has retired after more than 30 years of service. Mr. Harte has been elected vice-chairman of the board. Perry W. Andreas, vice-president in charge of operations, has been named executive vice-president.

Assistant Manager

J. SCOTT GRIFFITH has been promoted from supervisor to assistant manager of the ceramics and minerals research department as Armour Research Foundation, Illinois Institute of Technology, Chicago, Ill. He joined the staff as an assistant mineralogist in 1941, and was appointed supervisor of geology and mineralogy in 1945.

OBITUARIES

FRANK L. BASS, chief chemist at the Bath, Penn., plant of the Keystone Portland Cement Co., New York, N. Y., died suddenly on August 21 at his home in Easton, Penn. He was 63 years of age. Born in Hokendauqua, Penn., Mr. Bass attended Moravian College and Lehigh University, Bethlehem, Penn. He had a long career in the cement industry, having served as chemist or chief chemist with Vulcanite, Edison and Capitol cement companies, and for over 25 years as chief chemist for Keystone Portland Cement Co. He was also associated for a number of years with Richard K. Meade, noted cement authority.

R. G. FOSTER, manager of the lime department of Winnipeg Fuel and Supply Co., Winnipeg, Canada, passed away on July 6. Mr. Foster had been active in affairs of the National Lime Association and regularly attended its operating meetings.

JESSE H. DYE, founder of the Memphis Concrete Silo Co., Memphis, Tenn., died August 30. He was 64 years old and had established the firm in 1934 with a branch in Eagle Lake, Texas.

Have you heard the Story of the TONGUE-TIED TRAVELING SALESMAN?

NO, IT'S NOT the kind of story that you might suspect.

It's a sad story of the shipping sack that simply couldn't talk . . .

. . . the sack that, because of dull, lifeless printing, failed to "sell" the company's name and the merits of its product.

But, fortunately, we had a cure!

Through the application of our exclusive Kolorseal process, we produced bright, friendly, durable colors that *talked right out* and made a memorable impression on all.

Make the most of the advertising possibilities of *your* shipping sacks. Send for proof of Kolorseal's magnetic sales appeal. There's a Raymond man nearby. Write or call.

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MULTIWALL PAPER SHIPPING SACKS

INDUSTRY NEWS

Cover Picture

THIS MONTH'S COVER ILLUSTRATION shows an aerial view of the new quarry and crushing plant of Henry J. Kaiser Co., near Clayton, Calif. The quarry is about 650 ft. above the plant with a large surge pile near the primary crusher and several flights of belt conveyors leading to the plant. The stockpiling system is push-button controlled from a penthouse above a four-compartment bin. One man controls all equipment from the surge pile through the stockpiling tripper.

Marquette Expanding Capacity

MARQUETTE CEMENT MANUFACTURING CO., Chicago, Ill., is undertaking a $16 million expansion program which will add nearly 3,000,000 bbl. to its annual capacity. Involved is a 1,200,000 bbl. increase in capacity at its Cape Girardeau, Mo., plant, a 400,000 to 500,000 bbl. increase at its Des Moines, Iowa, plant, and an additional 1,200,000 bbl. to be made available either at its Oglesby, Ill., plant or, more likely, by construction of a new plant in the Chicago area. An effort will be made to have all three projects completed by the end of 1956.

Construction at Des Moines will involve additional grinding facilities and storage capacity which will bring total annual production to 2,500,000 bbl. Costing approximately $1,750,000, the project will start immediately and be completed about mid-1956.

At the Cape Girardeau plant, an independent one-kiln, wet process 1,200,000 bbl. unit will be built, complete with cement storage and bulk loading facilities at its Mississippi River dock. It is expected that economies in construction will be effected by (1) eliminating the usual raw material craneway storage from the design of the new unit and (2) by horizontal rather than vertical arrangement of the various facilities required for the raw and finish grinding operations. New plant construction, expected to cost less than $6,500,000, will bring annual capacity at Cape Girardeau to a total of 3,000,000 bbl.

Plans for the increased production in the Northern Illinois - Wisconsin market currently served by the Oglesby plant are presently uncertain. The decision as to whether to locate the new facilities at Oglesby or at one of several sites already surveyed in the Chicago area will, however, be made soon.

Buys Control of Quarry Firm

AMERICAN-MARIETTA CORP., Chicago, Ill., has acquired control of Whiterock Quarries, Bellefonte, Penn., by buying a majority interest from Whiterock stockholders. Whiterock, which produces aggregates, agricultural limestone, fluxstone, and chemical stone, will continue doing business as usual and maintain the same plant and office personnel. However, as a result of the transaction, Ray C. Noll resigned as president and general manager as well as director. In 1954, American-Marietta acquired control of Standard Lime and Stone Co., Baltimore, Md.

Takes to the Air

NEW YORK TRAP ROCK CORP., New York, N. Y., has purchased a helicopter for the use of executive personnel supervising operations at the company's four plants at Haverstraw, Clinton Point, Tomkins Cove and Verplanck. The helicopter, equipped with floats for landing on water or land, has a range of 150 miles, a cruising speed of 65 m.p.h. and a service ceiling of 16,000 ft. Through use of the helicopter, officials can visit the four plants in a morning's time, compared to an all day drive by automobile.

Flood Curtails Cement Output

HEAVY RAINS AND DISASTROUS FLOODS which hit northeastern United States late in August caused mild to severe damage to the Lehigh Valley cement plants. According to a *Wall Street Journal* report, the Martin's Creek plant of Alpha Portland Cement Co. suffered the worst damage, both the quarry and plant having been inundated. Coplay Cement Manufacturing Co. reported that its limestone mine near Allentown, Penn., was flooded, but cement production was not curtailed since the company's other quarries remained dry. Other Lehigh Valley plants suffered little or no damage, according to the report.

As an aftermath of the Eastern flood, the eastern cement manufacturers are faced with the big task of shuffling distribution to take care of emergency needs in the flood-battered areas.

Buys Four Feldspar Firms

PACIFIC TIN CONSOLIDATED CORP., New York, N. Y., has announced plans for feldspar mining and processing in the Southern Appalachian moun-

Wilson P. Foss, Jr., New York Trap Rock Corp. board chairman, seated with pilot C. Wm. Barolet, in the helicopter recently purchased for speedy travel between the company's four plants

tains, with the purchase of four feldspar firms. The companies are: Feldspar Flotation Corp., Spruce Pine, N. C.; Feldspar Milling Co., Burnsville, N. C.; Feldspar Corp., Erwin, N. C.; and Appalachian Minerals Co., Monticello, Ga. These companies are owned jointly by C. P. Rogers of Tryon, N. C., and W. F. Deenen of Johnson City, Tenn. Carroll P. Rogers, Jr., manager of the Feldspar Flotation Corp., will be general manager of the four plants, and there will be no other changes in personnel or policies. The four companies are said to produce about 25 percent of the ground feldspar processed in the United States.

Opens Gypsum Warehouses

ATLANTIC GYPSUM CO., Corner Brook, Newfoundland, has expanded its warehouse distribution facilities, and is operating at full capacity. The government-owned firm opened warehouses at Three Rivers, Quebec City and Chicoutimi, Que., in 1955, and has arranged for warehousing and distribution in the Toronto area. Previously, it had a warehouse in Montreal only. The company has added aluminum-backed lath and black outside sheathing to its line. It is planned to introduce gypsum board with a fire-resistant core containing fiberglass and asbestos fiber. Long-term development plans include the sale of gypsum rock, but loading facilities and roads are needed.

Portland Cement Production

THE PORTLAND CEMENT INDUSTRY produced 26,783,000 bbl. of finished cement in June, 1955, as reported by the Bureau of Mines. This was an increase of 17 percent over the June, 1954, figure. Mill shipments totaled 31,260,000 bbl., an increase of 9 percent over the June, 1954, figure, while stocks were 4 percent less than those on hand on the same date last year. Clinker production during June, 1955, amounted to 25,004,000 bbl., an increase of 18 percent over the June, 1954, figure. The output of finished cement during June, 1955, came from 157 plants in 37 states and Puerto Rico. During the same period of 1954, 22,802,000 bbl. of finished cement were produced.

Close Fluorspar Plant

GENERAL CHEMICAL DIVISION, Allied Chemical & Dye Corp., New York, N. Y., has announced the closing of operations at its Deming, N. Mex. fluorspar processing plant. Officials of the company reported the reason for the shut-down was non-profitable competition with foreign producers. The plant was established in 1933, and processed about 2000 tons of ore monthly, manufacturing an acid grade concentrate. M. A. Scheriff, plant superintendent, said that if conditions change within several years, the plant may be reactivated.

Cement Plant Under Construction

PEERLESS CEMENT CORP., Detroit, Mich., has begun construction of a new 1,000,000-bbl. cement plant at Detroit, which is expected to be completed in 1956 at an estimated cost of $7,500,000. Speaking before a group of public officials who recently visited the new plant site, W. C. Russell, president, expressed confidence that cement supplies in Michigan will be adequate in 1956 and 1957 for highway and other public works programs. He pointed out that 4½ to 5 million additional barrels of cement (or 33 percent over present supplies) will be available by 1957, based upon expansion programs of Peerless and six other manufacturers.

Drilling Symposium

THE UNIVERSITY OF MINNESOTA will present its fourth annual Drilling Symposium, October 13, 14, and 15, at the Center for Continuation Study on the Minneapolis campus. The subject chosen by the Planning Committee relates to the use of tungsten carbide in rotary exploration drilling.

The symposium will begin with the nature of tungsten carbide, then discuss various factors in the mounting of tungsten carbide inserts in bits. The experience of rotary drillers in the United States and abroad will be reported on, including reports from continental European experts. The use of combined rotary and percussion methods will be considered, and the symposium will conclude with a general round table discussion on October 15.

Union Objects to Mexican Quarrying

THE SAN DIEGO CITY COUNCIL has approved specifications permitting the use of rock mined at the Mexican-owned Coronados Islands for construction of a $10,000,000 industrial pier. A. F. of L. officials, however, have warned the city that if such stone is used, it would be labeled "hot cargo," and labor would walk off the pier job. The objection is to lower-paid Mexican labor quarrying the stone.

To Increase Cement Production

DIAMOND ALKALI CO., Cleveland, Ohio, has announced plans to increase capacity at its Painesville, Ohio, portland cement plant by about 320,000-bbl. of cement annually. The program, costing approximately $1,000,000, calls for a new finished cement grinding mill with auxiliary equipment. The expansion is expected to be completed in 1956. This is the second step in a long-range program, the first being in 1954, when plant capacity was increased by 380,000 bbl. of cement annually, through the conversion of a lime-reburning kiln to cement production. Completion of the program will give the plant an annual production of 1,900,000 bbl. of cement, a total increase of 700,000 bbl. within a three-year period.

National Gypsum Record Sales

NATIONAL GYPSUM CO., Buffalo, N. Y., reports sales and earnings for the first six months of 1955 were the highest in the company's history. Earnings were 31 percent higher at $7,789,000 or $2.32 per share, compared to $5,914,000 or $2.09 a share on a smaller number of outstanding shares in 1954. Sales in the first half of 1955 amounted to $71,743,000, about 19 percent above the same period of 1954, which totaled $60,015,000.

The company recently announced an expansion program, costing approximately $75,000,000, for completion by 1960.

Sues N. Y. Thruway Authority

KENNETH A. AND MADALYNE MACKENZIE, owners of a sand and gravel company in Clifton Springs, N. Y., have filed a $1,760,160 damage suit against the New York State Thruway Authority. The suit contends that almost 15 acres of sand and gravel deposits have been damaged or made inaccessible by Thruway construction. The MacKenzies also claim they have received no compensation for 568,000 cu. yd. of gravel used in the Thruway.

Portable Gravel Plant

MADISON STONE & SUPPLY, INC., Madison, Ind., has set up a portable crushing and screening plant to process creek gravel at a site between China and Manville, Ind. Officers of the corporation are John Andrew, president and operator, Si Crump, vice-president, and Emmett Kaelin, secretary-treasurer. Five men are employed, and four trucks are operated.

Material Service Sales

MATERIAL SERVICE CORP., Chicago, Ill., reports net sales of $58,102,000, as compared with 1953 net sales of $55,854,000. Net earnings amounted to $4,298,000 for 1954, against $3,823,000 in 1953. Expenditures during 1954 for fixed asset additions and replacements amounted to $3,652,000, and early in 1955, the company purchased coal properties and equities of companies in related businesses for over $11,000,000.

Sets Sales, Production Records

AMERICAN AGGREGATES CORP., Greenville, Ohio, reported new records in sales, production, and earnings for the fiscal year ended March 31. The company marketed 10,724,535 tons of sand, gravel, and slag, compared with 10,377,296 tons in the previous years. Gross sales amounted to $15,557,951, including $10,740,258 for sand and gravel and $4,817,693 from allied activities including concrete, concrete products, slag, and dredging operations. Net earnings after income taxes were $1,927,921 compared with $1,709,673 the previous year. Dividends of $5 per share on preferred stock and $2.25 per share on common stock were declared. During the year the company negotiated seven labor agreements without work interruptions with wage increases granted averaging 7.3¢ per hour.

British Columbia Cement Plant

INTERNATIONAL CEMENT CORP. has started land clearing for a $5,000,000 cement plant in British Columbia, located 11 miles east of Chilliwack and 60 miles east of Vancouver in the Fraser Valley. Dr. William K. Waller, president of the new cement plant, stated that machinery contracts have been let to the Skoda factory in Czechoslovakia. Current plans call for completion of the 2500 bbl. per day plant in May, 1956. It is expected that most of the output will be shipped to South America, including Venezuela and Peru, in ships which will bring back iron ore for a steel mill Dr. Waller's interests hope to establish in British Columbia.

Pavement Yardage

AWARDS OF CONCRETE PAVEMENT for the month of August were listed by the Portland Cement Association as follows:

	Sq. yd. awarded during August, 1955
Roads	5,321,222
Streets and alleys	3,737,150
Airports	287,906
Total	9,346,278

Potash Expansion

UNITED STATES POTASH CO., Carlsbad, N. M., will spend about $3 million to increase the output of its mine near Carlsbad and to expand refining facilities to provide about 20 percent additional productive capacity.

Expands Gypsum Plant

THE UNITED STATES GYPSUM CO. has applied for a permit to build a group of buildings for its gypsum plant at New Orleans, La. The buildings will have a total floor area of 113,700 sq. ft., and will include an office building, locker building, a plant warehouse and packing department, and a kettle and mill department, constructed of concrete block and steel. The expansion is expected to cost approximately $1,491,339.

Ideal Cement Expands

IDEAL CEMENT CO., Denver, Colo., is expanding its Boettcher, Colo., cement plant, at a cost of about $5,000,000. Present plant capacity of 1.2 million bbl. of cement annually will be almost doubled. Installations will include new grinding equipment, raw material blending machines, and preheaters for two rotary kilns. Additional cement storage silos are also included in the program. The present power plant is being abandoned, with power to be furnished by the Public Service Co. of Colorado.

Coming Conventions

October 10-13, 1955—
American Mining Congress, Annual Convention, Las Vegas, Nev.

October 17-21, 1955—
National Safety Council, 43rd Congress and Exposition, Conrad Hilton, Congress, Morrison and La Salle Hotels, Chicago, Ill.

October 19-21, 1955—
National Lime Association, Combined Annual Convention and Operating Meeting, Del Monte Lodge, Pebble Beach, Calif.

October 20-21, 1955—
Empire State Sand, Gravel and Ready Mix Association, Fall Meeting, Hotel U. S. Thayer, West Point, N. Y.

Oct. 31-Nov. 1, 1955—
American Concrete Institute, Southeast Regional Meeting, Atlanta Biltmore Hotel, Atlanta, Ga.

November 1-3, 1955—
Southeastern Concrete Pipe Association, 8th Annual Convention, Key Biscayne Hotel, Miami Beach, Fla.

November 14-16, 1955—
American Concrete Pipe Association, Fifth Annual Short Course School of Instruction, Chase Hotel, St. Louis, Mo.

January 11-14, 1956—
American Road Builders' Association, 54th Annual Convention and Exhibit, Miami Beach Auditorium, Miami Beach, Fla.

January 23-25, 1956—
National Concrete Masonry Association, 36th Annual Convention, Roosevelt Hotel, New Orleans, La.

February 13-16, 1956—
National Sand and Gravel Association, 40th Annual Convention and Biennial Show, Conrad Hilton Hotel and Chicago Coliseum, Chicago, Ill.

February 13-16, 1956—
National Ready Mixed Concrete Association, 26th Annual Convention and Biennial Show, Conrad Hilton Hotel and Chicago Coliseum, Chicago, Ill.

February 15-17, 1956—
National Agricultural Limestone Institute, Blackstone Hotel, Chicago, Ill.

February 20-22, 1956—
National Crushed Stone Association, 39th Annual Convention and Exposition, Conrad Hilton Hotel, Chicago, Ill.

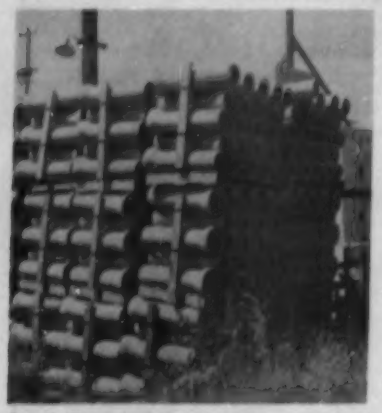
March 6-10, 1956—
American Concrete Pipe Association, 48th Annual Meeting, The Broadmoor, Colorado Springs, Colo.

HINTS AND HELPS

PROFIT-MAKING IDEAS DEVELOPED BY OPERATING MEN

Palletize Pipe Handling

A PACIFIC NORTHWEST CONCRETE PIPE MANUFACTURER has found it advantageous to place small diameter pipe on pallets so that they may be



Small diameter concrete pipe are placed on pallets for convenient handling with a lift truck

conveniently handled and stockpiled with a lift truck. After delivery, the pallets are returned to the plant. Each pallet carries 23 small diameter concrete pipe.

Feed to Concrete Panel Saw

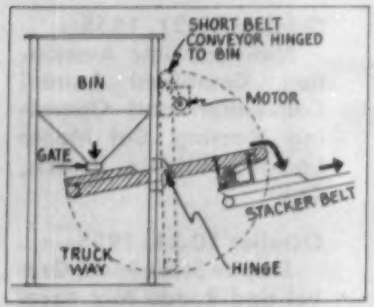
AT A PACIFIC COAST CONCRETE PRODUCTS PLANT, using the Van Loon semi-automatic machine for casting cored concrete panels, a saw is used at times to trim panels to exact sizes to comply with specifications.

The cured panels are placed on the pipe uprights shown in the illustration. At the top of each pipe is mounted a steel ball bearing with the ball free to move in its housing. Thus, the panel rides on a multiplicity of ball bearings free to move horizontally in any direction.

The panels are made of pumice concrete and, due to the method of erection, are said to be relatively free from expansion and contraction, and provide an attractive and crack-free wall.

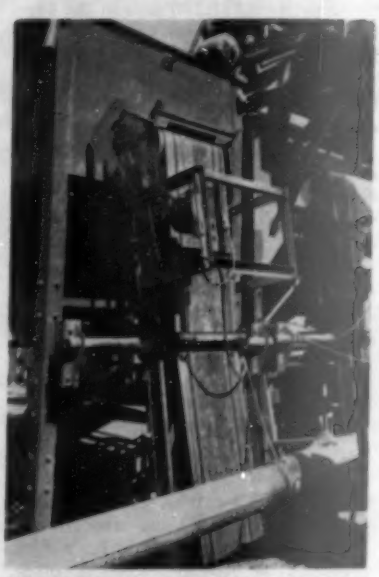
Swivelled Bin Unloader

AT A SMALL PLANT recently encountered, the sizing screen was mounted over conventional steel truck loading bins. The normal procedure was to



Cross section showing how belt conveyor swivels into position under bin

truck the material to the place of use as fast as produced. If material was to be stockpiled, a short belt conveyor was mounted alongside each bin. Each



Pivoted short conveyor belt swings into place below bin when in use

conveyor was pivoted near its center so the assembly could be quickly swung under the bin gate and the aggregate moved from the bin to the stacker belt conveyor.

Preparing Crusher Run "Slurry" for Road Base

IN CALIFORNIA nearly all crusher run road base material has to be prepared as a "slurry"; that is, mixed with a small amount of water, usually

Road base "slurry" is prepared in rotary mixer on top of truck loading bins. Material falls to steel silo at the end of bins

from 5 to 7 gal. per ton. Most of this material is in the minus 1-in. range, but larger top size stone is sometimes used.

A new producer of crushed stone installed a small rotary mixer above

Ball bearings mounted on top of pipe uprights permit free movement in feeding concrete panels to saw for trimming to exact specifications

and to one end of the truck loading bins. Water sprays are provided in the cylindrical mixer. A reclaiming belt conveyor operating in a tunnel delivers to an inclined cross belt conveyor which elevates the stone to a shuttle belt conveyor on top of the truck bins. The shuttle belt conveyor can also deliver material direct to the mixer. The finished road base material falls into the steel silo at the end of the truck loading bins as shown in the illustration. This set-up also is used to prepare a stabilized base material in which a small amount of portland cement is added to the aggregates in the batch.

Wear-Resisting Chute

A CHUTE constructed similar to a flight of steps and located between two bins is shown in the illustration.

Chute made up of a series of flights to prevent wear

There are eight flights in the chute. The screen, above, removes "flats" which are sent to a Telsmith Gyrasphere crusher for further reduction. By having a series of steps in the chute, the cascading material is "stone against stone" which prevents excessive wear. Butler bins are used in this plant.

Conveyor Drive

In the illustration is shown a unique arrangement at the end of a concrete sand stacker belt conveyor. The upper belt conveyor, to the right, has a Yuba Schrock motorized head pulley. This belt delivers material to a short belt conveyor that is swivelled to spread the sand out into several piles for adequate drainage. The short belt conveyor also has the same type head pulley.

One of the advantages of this type pulley is its light weight. Some of the advantages claimed for this pulley is that it does not have exposed gears, sprockets or drive chains, it can be installed quickly, and lubrication is not a problem.

Short conveyor, above, can be swivelled to distribute sand for better drainage

Prevent Erosion

AT A SAND AND GRAVEL PLANT in the West, waste wash waters flow to a banked-off section of the pit which is about 200 ft. deep. As the ground is largely gravel, all water seeps away with no return to the plant. The illustration shows how erosion at the plant was prevented by arresting the flow from the pipe into an old oil drum with boulders below to take the impact of falling water before it continues in a ditch to the pit where it is wasted.

Wasted wash water flows through old drum to boulders below to prevent erosion

Safety Hood for Haulage Unit

AT A CRUSHED STONE PLANT in the Northwest, two W-55 Koehring Dumptor units are used to haul stone from the quarry to the primary crusher. The trucks have been in service for 18 years, and the only changes made have been the installation of hydraulic brakes.

The protective hood over the driver's seat permits front and rear vision,

Hood over driver serves as a protection against falling stone

and the driver is shielded from stone that might dribble out of the loading bucket or from some obstruction which the driver might back into. The two haulage units carry about 125 t.p.h. over easy grades, a distance of about 600 ft.

Cut Up Steel Tanks for Tunnel Conveyor

WHEN SOMERSET CRUSHED STONE INC., Bernardsville, N. J., enlarged its plant recently, a 42-ft. long tunnel was built out of discarded 11-ft. dia. asphalt tanks. The tunnel, passing beneath a quarry haulage roadway, houses a 42-in. x 72-ft. belt conveyor connecting the company's new and old plants. Enveloped with reinforced concrete, the entire installation was completed in only three days, resulting in a minimum loss of operating time of the old plant.

Conveyor tunnel (11 ft. dia.) made from old asphalt tanks

NEW MACHINERY

Self-Propelled Shovel-Crane

SCHIELD BANTAM CO., Park St., Waverly, Iowa, has announced a self-propelled ⅜-cu. yd., 6-ton shovel-crane, designated Model CR-35. It has an outside turning radius of 19½ ft., and features two-speed independent travel. The steering mechanism and brakes are controlled hydraulically, while the travel mechanism and upper machinery of the shovel-crane are operated mechanically.

A fully enclosed bevel gear drive is used at the lower end of the vertical drive shaft to transmit drive to the rear axle. The unit has four independent operation travel speeds forward and reverse, with a low speed of 1.06 m.p.h. at 1000 r.p.m., and a high speed of 5.54 m.p.h. at 2000 r.p.m.

Attachments include crane, clamshell, dragline, shovel, trench hoe, magnet, grapple, pile driver, and backfiller. Outriggers, counterweight, and a 25-ft. crane attachment are standard equipment.

Conveyor Belt Installation

UNITED STATES RUBBER CO., Rockefeller Center, New York 20, N. Y., has introduced two slide rules, a horsepower calculator and a carcass or belt fabric selector for use in designing conveyor belt installations. The slide rules were developed to eliminate involved calculations. Five settings on the horsepower calculator are said to give the horsepower needed for 98 percent of conveyor belting systems. A maximum of seven settings will give drives for level, incline or decline, manually operated tripper and self-tripper systems. The carcass selector picks the belt fabric, as well as the maximum and minimum number of plies for proper troughing, and minimum pulley diameters for the entire system—take-up, drive, tripper and idler pulleys.

The slide rules are part of a conveyor belt construction kit with which it is possible to make over 2000 different sample conveyor belts.

Crane-Shovel

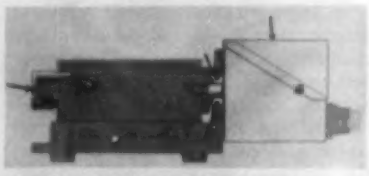
BALDWIN - LIMA - HAMILTON CORP., Construction Equipment Division, Lima, Ohio, has introduced a ½-cu. yd. power shovel, 13 to 15-ton capacity crane, known as the Lima Type 24 Jobmaster. It is available with crawler or rubber mountings, and is readily convertible to shovel, crane, dragline or pull shovel application. On a truck or wagon mount, the crane has a lifting capacity of 15 tons at a 10-ft. radius; as a crawler crane, it has a 13-ton lifting capacity at a 10-ft. radius.

Maximum overall length of the standard crawler truck is 10 ft. 2⅛ in., and overall width is 8 ft. with 16-in. treads. The machine is equipped with four conical rollers, two in front and two in the rear with the standard crawler truck. A wider and longer crawler truck is available for greater ground bearing area requirements. Three tread widths are available. Six conical rollers, four in front and two in the rear, are used on the rubber mounted units and on machines with the large trucks. The rollers are mounted on anti-friction bearings.

As a shovel, it is equipped with a 16-ft. 6-in. boom and 13-ft. 3-in. dipper handle. Crane booms, pin or bolt-connected, with an all-purpose point shaft are available from 30 to 80 ft. A 10-ft. jib is also available, and diesel or gasoline power plants may be had. Optional features include independent propel, auxiliary third drum and power load lowering.

Rotating Fairlead

BUCYRUS-ERIE CO., South Milwaukee, Wis., has brought out a full rotating type fairlead for use on its 22-B ¾-cu. yd. draglines. Standard equipment on present 22-B models, the fairlead, with suitable bracket and anchor pin, can also be used to replace the old style swinging, or hinge type fairlead on 22-B draglines in the field. The new unit is designed to lengthen drag rope life and lessen maintenance for fairlead guide plates and sheaves. It is equipped with tapered roller bearings, and is located off center of the revolving frame in line with the rope lead from the center of the drum. Outside sheave or rollers are not required on the frame.



Dust-Tight Solenoid Valves

C. B. HUNT & SON, INC., Salem, Ohio, has improved its "O"-type solenoid valves by changes which are said to protect the operating parts from

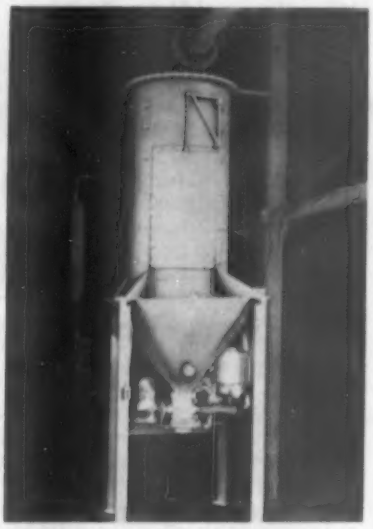
dust and grit. A sintered bronze filter is provided in the breather hole of the spring cap, which permits air to pass through the filter in either direction, but prevents the entrance of dust or grit. A sleeve, sealed with "O" rings at two places, keeps dust or foreign materials from entering the area where the solenoid armature contacts the valve plunger. The top half of the two-piece cover for the solenoid overlaps the bottom half, protecting the solenoid, even during "clean up" operations.

Two-Coil Magnetic Pulley

STEARNS MAGNETIC, INC., Milwaukee, Wis., has introduced a two-coil electro-magnetic pulley to remove tramp iron in conveyor operations. It is said to provide an effective flux pattern with a deep magnetic field at the center of the pulley. It is also possible to install a two-coil pulley of smaller diameter than a three-coil pulley handling the same job, thus reducing equipment and power costs without decreasing tramp iron protection. The two-coil pulley is available in a variety of widths and diameters ranging from 12 to 60 in.

Add Four-Wheel Hydraulic Brake on Tractor-Shovel

CLARK EQUIPMENT CO., Construction Machinery Division, Benton Harbor, Mich., has announced that four-wheel hydraulic brakes, previously available on larger machines in the line, are now standard equipment on the Michigan Model 75A tractor shovel. The unit has a 1-cu. yd. bucket capacity and weighs 12,750 lb. With four-wheel drive and rear wheel steering, it is offered with either a 77-hp. gasoline engine or an 80-hp. diesel engine. A 12-volt electrical system facilitates starting in cold weather. Also featured is a power train with a torque converter, power-shift transmission and planetary-wheel drive axles. The converter's three-to-one torque multiplication automatically provides an increased flow of power when necessary. The unit has four speeds forward and reverse with a maximum of 26 m.p.h. in either direction.



Dust Collector

MAJAC, INC., Sharpsburg, Penn., has introduced a power-driven dust collector and fractionator, available in 13 capacities, from 300 to 30,000 c.f.m. of gas throughput, with a total horsepower of 15 being used on the largest machine. The collector operates by discharging incoming dust-laden air or gas against rotating deflector plates mounted on a power-driven shaft. This reverses the direction of air flow, dropping out heavier particles. The air or gas then continues upward through a series of rotating separator blades and additional material is thrown out. The small fraction of dust which finally passes the multiple blades is thrown against the outer shell by centrifugal force, and discharged through adjustable slots to the bottom of the machine.

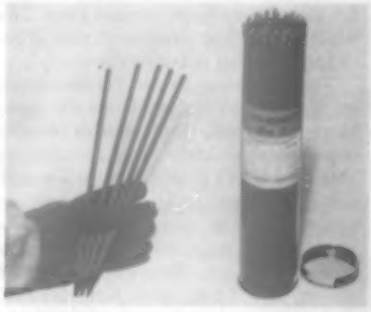
The unit can be operated either as a dry or a wet collector. In dry collecting, it removes particles down to .5 micron, and in wet operation, down to .1 micron.

Hydraulic Starting System

GENERAL MOTORS CORP., Allison Division, Indianapolis, Ind., has announced the "Hydrostarter," a hydraulic starting system for diesel engines. It consists of a hydraulic motor, a piston type accumulator, an engine driven pump, a reservoir and a manual pump. After the accumulator has been loaded and sealed with an inert gas, an engine-driven pump maintains pressure and the manual pump permits emergency recharging. The starter's high static torque, 80 ft./lb. at 3000 p.s.i. working pressure, is said to operate under extremely adverse conditions. The motor extends slightly more than 9 in. from the engine flywheel housing, and can be coupled to most diesel engines up to 300 hp. in the same way as a conventional electric starter.

Log Washer

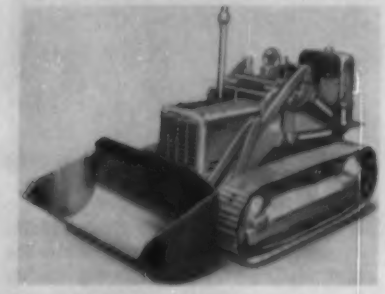
MCLANAHAN & STONE CORP., Hollidaysburg, Penn., has brought out the McLanahan Mudmaster, a log washer designed specifically for the removal of clay and other waste material from sand and gravel, crushed stone, ore, phosphate and similar products. It has 10-in. square box section logs, and is available in 25 and 30 ft. lengths. Power requirements vary with the type of material handled, length of logs and other factors. However, the 25 ft. length usually requires 50 hp., and the 30 ft. length, 60 hp. Included are a fabricated steel box, open spur gearing with protective guards, anti-friction bearings and heat treated paddles. It is furnished as a self-contained unit including V-belt drive, ready for mounting on foundations.



Hard-Facing Alloy

WALL COLMONOY CORP., 19345 John R Street, Detroit 3, Mich., has brought out a low-cost, low hydrogen hard-

facing alloy, Colmonoy No. 2, for application to working surfaces of construction, mining and aggregate handling machinery and similar heavy-duty equipment. It is an iron-base chrome-molybdenum-silicon alloy, and is said to provide high abrasion and impact resistance, as well as good weldability. Spatter loss is said to be low, with good fluidity. It is not, however, recommended for applications requiring heavy build-up where crack-free deposits are needed. As deposited, it has a Rockwell hardness of 50-55 on the C scale following the first pass and 55-60 after the second pass. Tensile strength is about 75,000 lb./sq. in., and specific gravity is 7.6. It is available in ⅛, $\frac{5}{32}$, $\frac{3}{16}$, and ¼-in. dia. electrodes.

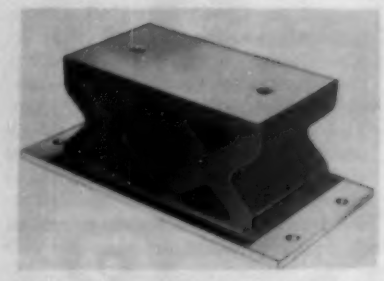


Tractor-Shovel

CATERPILLAR TRACTOR CO., Peoria, Ill., has brought out the No. 955 Traxcavator, incorporating the advantages of integral tractor and shovel design. Utilizing a 1½-cu. yd. bucket, it features a tilt-back characteristic enabling the operator to tilt the bucket back in any position, and as much as 40 deg. at the ground line.

A full flow hydraulic oil filter is mounted on the left fender for easy accessibility in servicing, while the hydraulic valve and tank are fastened to the right fender. Hydraulic cylinders are located above the tracks to minimize damage from mud and rocks. Long track roller frames are utilized for stability and low ground pressures, while three bar grouser track shoes supply traction for shovel use.

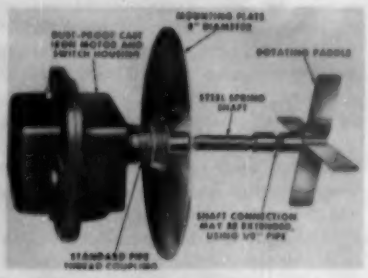
The diesel engine and gasoline starting engine are started from the operator's seat with the controls readily accessible. A single lever starting engine clutch and pinion control is standard equipment, as is a 6 volt starting system for the starting engine. The unit is also equipped with an oil-type flywheel clutch. Two reverse speeds up to 264 f.p.m. and four forward speeds up to 607 f.p.m. are available. Overall dimensions of the 70-hp. unit are: length 15 ft. 1¼ in.; width 80 in.; height 82⅛ in.; ground clearance 13$\frac{7}{16}$ in.; weight 21,480 lb.



Vibration and Noise Resistor

LORD MANUFACTURING CO., 1635 West 12th St., Erie, Penn., has brought out bonded-rubber lattice mountings for heavy vibration and noise problems, particularly in the low-frequency, high-amplitude range. Resembling a sandwich in construction, the mountings feature a latticed rubber section which is bonded to horizontal steel plates at the top and bottom. The patented lattice design permits the shock load to be carried by the rubber in shear, providing a high degree of horizontal stability. As there are no parts moving against one another, lubrication is not required.

The damping characteristic of the elastomer stops excursion of machinery when passing through resonance in starting or stopping. The large deflection of lattice mountings make them particularly effective against low-frequency disturbances and/or where extremely high degrees of isolation are required. In cases where the operating speed of the machine to be mounted is extremely low, these mountings may be installed in series for even more effective vibration isolation. Capacities ranging from 250 to 3000 lb., and static deflections from ¼ to 1½ in. are available.



Bin Level Indicator

THE BIN-DICATOR CO., 13946 Kercheval Ave., Detroit 15, Mich., has introduced the Roto-Bin-Dicator, a paddle-type bin level indicator for special installations. The unit is particularly adaptable to installations in bins under pressure or vacuum; bins, chutes or conveyors handling materials with large lumps which tend to "bridge" over a diaphragm; and bins handling materials which tend to "rat-hole" and prevent operation of a diaphragm.

A slowly rotating paddle, mounted on a flexible shaft, projects into the bin and is driven by a small motor mounted in a housing outside the bin. When material in the bin partially or entirely covers the paddle, the rotation is stopped, and the torque exerted by the motor actuates a Micro-switch in the motor housing. The shaft flexes as required under impact or thrust of material and does not take on permanent distortion.

Installation requires only a hole in the bin wall to admit the paddle, attachment of a steel plate with six screws and connection to a power source.

Tandem Axle Trailer Dump

GALION ALLSTEEL BODY CO., Galion, Ohio, has announced a tandem axle trailer dump, designated Model SLM Transporter, for use with single rear axle tractors. Three optional Duoscopic center mounted, twin telescopic hoists provide lifting capacities from 24 to 34 tons. Available body lengths range from 19 to 24 ft. with payload capacities of 10 to 36 cu. yd. Ten gauge high resistant steel is used throughout the body with closely spaced 4-in. channel crossmembers welded to 6-in. I-beam longitudinals. Tandem Stabl-ride or center pivot bridge-type suspension is used on the heavy-duty pressed steel chassis. A selection of brake types, axle capacities, tires and optional equipment is offered.

Extend Turbine Line

ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis., has extended its WA-Series impulse steam turbine-generator line to 16,500 kw. The series now not only includes N.E.M.A. ratings, 2000 kw. and up, but also A.I.E.E. - A.S.M.E. preferred ratings up to and including 16,500 kw.

"Powerama" Crushing Plant

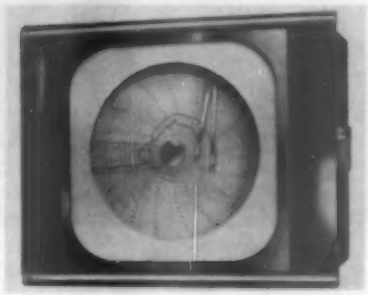
IOWA MANUFACTURING CO., Cedar Rapids, Iowa, displayed a Cedarapids Commander portable crushing and screening plant at General Motors Powerama held in Chicago from August 31 to September 25. The plant was operated 10 min. each hour to demonstrate the application of diesel power on portable plants. Limestone for crushing was trucked in daily from a Chicago area quarry. A ramp alongside the plant enabled spectators to see the operation.

Powered by a 300-hp. Detroit series 110 diesel engine, the Commander on display incorporated a receiving hopper and 30-in. reciprocating feeder, a 4- x 10-ft. horizontal vibrating screen, a 10- x 36-in. jaw crusher, a 30- x 25-in. double roll crusher, a 78- x 22-in. elevating wheel, a sand ejector screw, and 30-in. feed, undercrusher, and delivery belt conveyors.

To allay dust during demonstrations, the plant was specially equipped with a Johnson-March Corp. dust suppression system (arrow in one of the illustrations), which delivered a mixture of water and wetting agent compound to spray nozzles mounted at the receiving hopper, the feed and discharge ends of the roll crusher, and the discharge end of the jaw crusher.

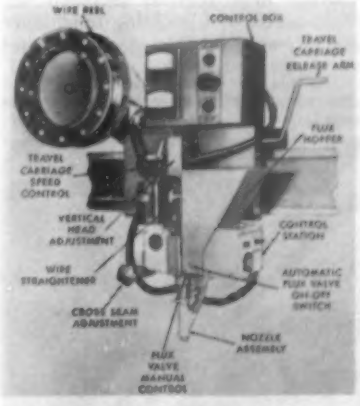
Bulk Cement Trailer

FRUEHAUF TRAILER CO., Detroit, Mich., has announced a bulk cement transporter which incorporates the advantages of the "Airslide" method of unloading and the strong, rigid, lightweight Aerovan structure. The transporter has a 100- to 120-bbl. capacity, and its single panel form is housed within the Aerovan structure. The 24-ft. container can be located backward or forward within this framework for effective load distribution. The Airslide principle, a development of the Fuller Co., enables unloading 120 bbl. of bulk cement in less than 7 min., by means of air forced through a specially woven fabric to agitate the load and break through its normal angle of repose. The bulk cement transporter provides a load tilt of 7 deg. on its 20-in. Airslide panel.



Two-Pen Potentiometer Continuous Recorder

THE BRISTOL CO., Waterbury, Conn., has announced an electronic Dynamaster potentiometer recorder which makes two continuous records simultaneously on a 12-in. round chart. It may be used to measure and control any variable which can be translated into an electrical quantity, such as temperature, pH, consistency, speed, pressure, weight, etc. Two simultaneous continuous records are helpful in the taking of wet and dry resistance bulb temperatures for humidity measurements, B.t.u. and temperature differential measurements, and speed of rotation from two different points on a paper machine.

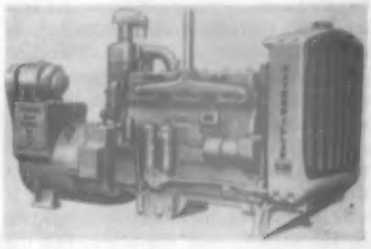


Automatic Welding Equipment

THE LINCOLN ELECTRIC CO., Cleveland 17, Ohio, has introduced a line of equipment for hidden or submerged arc welding, which includes three welding heads, controls and adjustments, accessories and two power sources. The welding heads, LAF-3, LAF-4, and LAF-5, offer a choice for either a-c or d-c current, field or shop welding, and constant potential or variable voltage power source. The controls permit a choice of instantaneous starting, either hot for intermittent welding or cold for precision starting; a choice of variable inching speeds, either slow or fast, away from or to the work; a choice of carriage operation to give stand-still starts, flying starts or manual control.

Mounting equipment is available to give stationary mounting, mounting on a self-propelled travel carriage, or on a self-propelled tractor. The heads can be adapted for Twinarc or tandem arc welding or for an oscillating attachment, the Spreadarc.

One of the power sources, Lincolnweld AC-75, giving 750 amperes continuous duty a-c power, has a power driven reactor control for setting current from remote switches on the welding head control box. The other available power source, Lincolnweld DC-750, a motor generator machine designed specifically for automatic welding, is rated at 750 amperes, continuous duty at 40 volts. It can also be paralleled with a second DC-750 for work requiring higher amperages.



Diesel Electric Sets

CATERPILLAR TRACTOR CO., Peoria 8, Ill., has announced a line of diesel electric sets with generators designed and built to match the engine powering it. The self-regulated units are designed to meet the needs of applications now served by self-regulated or externally-regulated generators. Featuring close voltage regulation, the units provide steady voltage from no load to full load. The power plants are easy to install, as no complicated switchgear or external voltage regulators are needed.

Heavy-duty, single-bearing and close-coupled construction are utilized for ease of maintenance. The single bearing is lubricated from a grease reservoir which requires filling once a year. The generator uses a compact, static regulator with no moving parts. The heavy-duty, laminated pole rotor is of rugged construction, and the complete generator is designed and built to last the life of the diesel.

Dutch Cement Plant Returns Recovered

LOCATED ONLY A SHORT DISTANCE from Maastricht, a city of 80,000 population in southern Holland, is the modern cement plant of Eerste Nederlandsche Cement Industrie which is referred to later as E.N.C.I. The dust problem from both the economic and public relations viewpoint has been of much concern to the company since the plant started operation in 1928. The mill is situated south of the city while the prevailing direction of the wind is southwest. Not only has the city grown in the direction of the plant, but the plant is located in an important agricultural area. As the principal raw material is the Maastricht chalk, a very soft and friable material, the problem is made more acute as stack dust is more easily formed.

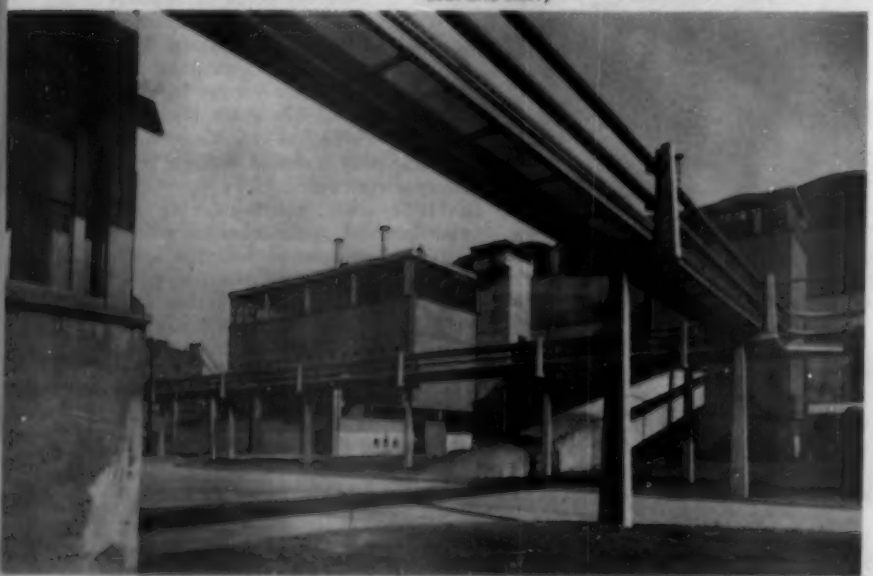
E.N.C.I. is a wet process plant which started with four Polysius kilns that produced about 260 metric tons (approximately 1525 bbl.) each per day. In 1951 the plant was modernized and capacity increased with the addition of a 394 ft. long Allis-Chalmers kiln. This kiln produces about 800 metric tons (approximately 4700 bbl.) of clinker per day. With this expansion program, total annual production was increased to 600,000 metric tons (about 3,500,000 bbl.).

Other improvements included the construction of a building for clinker and raw material storage, new cement mills, and coal preparation facilities. The coal preparation facilities serve the older part of the plant as well as the new. Another larger kiln is now being installed.

The quarry has a thick overburden, consisting of Loess (a fine sandy clay), sand and gravel. Part of the Loess is used as a raw material in cement manufacture. Chalk, to which a certain amount of Loess is mixed, is loaded in the quarry to railroad cars and hauled in trains to the plant. Cars are dumped to a roll crusher to crush the larger lumps. Owing to the softness of the material, little crushing is necessary.

Slurry is produced in wash mills. In a separate washing mill, a quantity of fat clay is mixed with water and this clay-slurry is added, in the other washing mills, to the chalk reduced in the crusher. Water content of the slurry is 32 percent. Material from the wash mills is pumped to large slurry tanks for blending. Slurry from these tanks is the feed to the ball mills. The product of the ball mills is sent to a second group of slurry tanks for intensive blending in preparation for feed to the kilns.

Storage structure with cement mill building, to the left, clinker conveyor tunnel, and crusher building, to the right. Note concrete supporting structure to carry pipelines for coal and slurry



Dust Control Problem

Due to the physical composition of the chalk, stack dust is more easily formed, representing from 15 to 20 percent of the clinker produced. To practically eliminate this dust loss, a large Cottrell electrical precipitator was installed at the back end of the kilns. It will be noted in the elevation

IN THIS ARTICLE

. . . the author describes the modernized E.N.C.I. cement plant at Maastricht, Holland. Stack dust is recovered by an electrical precipitator collector with the major portion returned into the firing end of the kiln. The remainder of the dust, containing the finest particles, is sold for fertilizer as it contains from 5 to 10 percent potassium sulphate.

Left: Looking toward firing end of 394-ft. wet process kiln. Note cylindrical steel bins, one of which is for coal and the other for stack dust blown into the flame

Right: Construction view of electrical dust precipitator installation on new kiln

By K. L. A. VAN DER LEEUW*

Dust to Firing End of Kiln

drawing that collected dust can be drawn off at several points. Although the dust collector does not operate selectively to obtain definite grain sizes, the coarser sizes are precipitated first and finer sizes are deposited at following draw-off points.

There is also another difference in the dust at the various draw-off openings. Although the stack dust in a rotary kiln is generally formed in the transition area between the drying and the calcining zone, it also contains a component coming from the sintering zone. These are principally alkali salts which are always present in small quantities in the raw materials.

At the high temperatures found in the sintering zone, all alkali salts are volatile, and the vapors of these salts are carried along with the kiln gases. In the drying zone of the kiln, the gases have been cooled down considerably so that the alkali salts condense at this point with the fine dust particles acting as condensation agents.

This fine dust contains an appreciable amount of alkalis, principally potassium sulphate. Only a few tenths of a percent of the contents is sodium salt. This rich calcareous product with a substantial percentage of potassium sulphate is a very attractive fertilizer for agriculture. It is marketed in two qualities; one containing 5 percent and the other 10 percent K_2O.

Although it was not difficult to dispose of the fine dust for fertilizer, the problem of returning the dust to the kiln was not immediately solved. Early attempts to add this material to the slurry failed since the viscosity of the slurry increased considerably. It would have been possible to remedy this by increasing the water content of the slurry, but more heat would be required for evaporation of the excess water which made it uneconomical.

*Chief of the Research Department, Eerste Nederlandsche Cement Industrie (E.N.C.I.), Maastricht, Holland.

Return Dust to Firing End

H. W. Mooser, for many years technical manager of E.N.C.I. and at present a member of the Board of Managers of the company, developed a method of blowing the dust directly into the flame at the firing end of the kiln. Due to the high temperature prevailing in the sintering zone, an easy and rapid setting occurs between the stack dust blown into the flame and the material entering into the kiln in normal operation.

This method has been patented in many countries (U.S.P. No. 2,477,-262). **The following advantages are summarized below:**

1. No material is wasted.
2. Dust blown into the sintering zone is heated to a much higher temperature than the other material in the kiln. Due to this high temperature, the potassium and other salts are evaporated. The potassium salts are in the finest particles of dust which is sold as a fertilizer. If the dust were added to the slurry, evaporation would be far less effective and consequently the potassium-content of the clinker would become higher with all the disagreeable consequences connected therewith.

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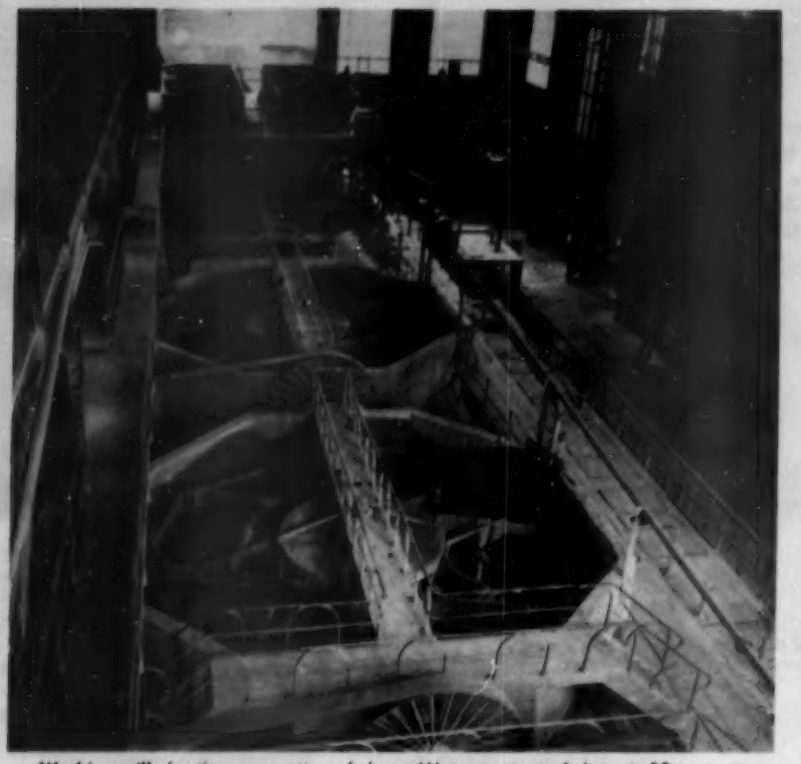
New section of plant, to the left; storage building in foreground; and old plant with four stacks, to the right



Washing mills for the preparation of slurry. Water content of slurry is 32 percent

3. As it is not necessary to mix the dust with water and it can be blown in a dry condition into the kiln, there is a saving in heat consumption in comparison with recovery of the dust by mixing it in the slurry.
4. With this process, it is possible to increase kiln production. The larger quantity of stack dust recovered by blowing it into the kiln contributes to the formation of clinker.

Equipment required for this system is very simple. The portion of the dust which is not removed as a fertilizer, is transported by a screw conveyor to a bin from which it is moved by a Fuller pump to a hopper at the firing end of the kiln. From the hopper, it is blown into the kiln, together with the pulverized coal, by means of compressed air.

Since this company started the practice of blowing stack dust into the kiln about 15 years ago, it has not been necessary to remove any stack dust as a waste product. A large tonnage of material which otherwise would have been wasted has been converted into cement of good quality. This process also has made it possible

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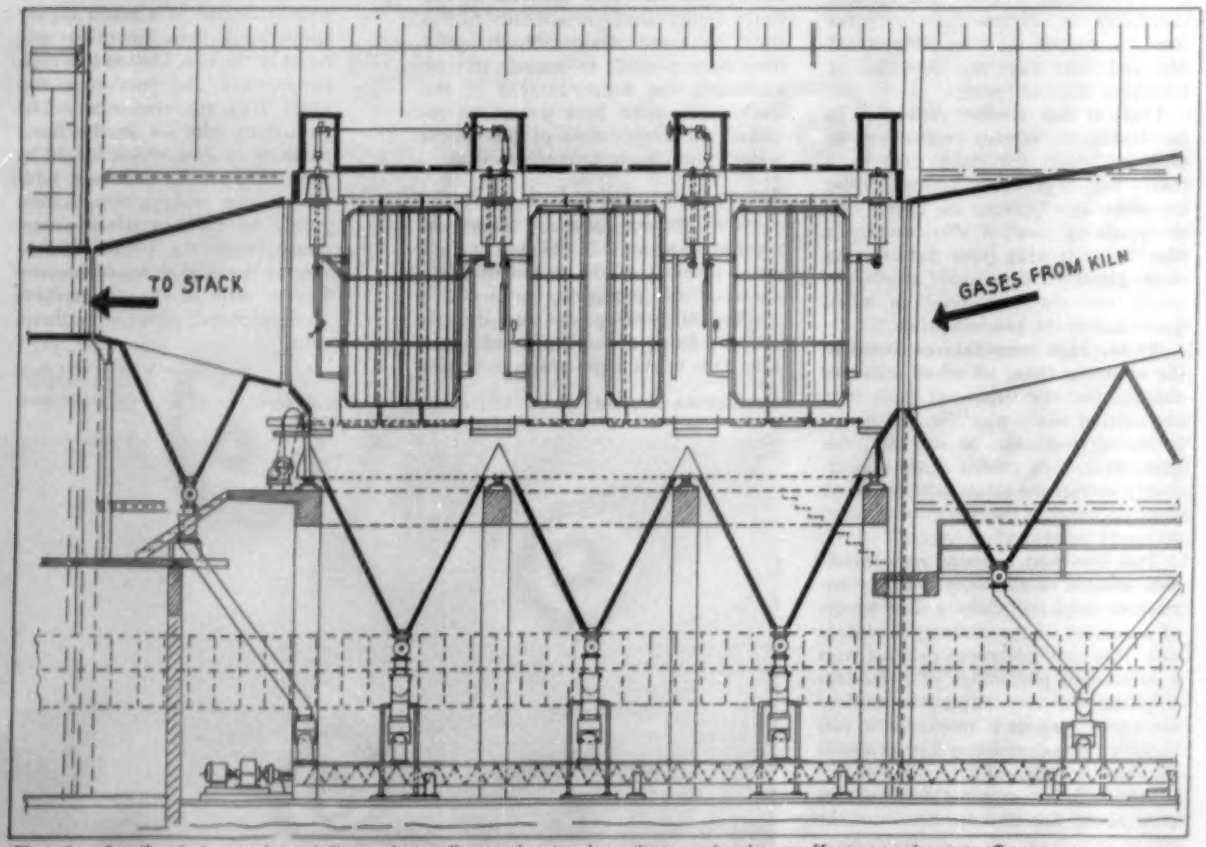


Elevation details of electrical precipitator dust collector showing how dust can be drawn off at several points. Coarser sizes are precipitated first and finer sizes are deposited at following draw-off points

View of entire plant with primary crusher, to the right, and screening, crushing and sand recovery sections, to the left

Compact, Efficient Gravel Plant

By WALTER B. LENHART

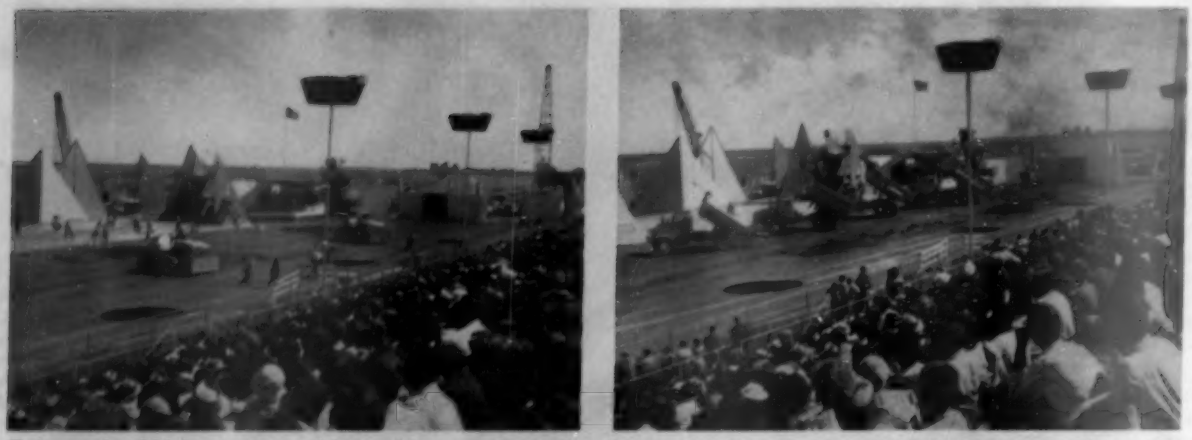
IN MAY, 1955, THE BAKER-MITCHELL-THWING CO. placed a sand and gravel plant in operation near Oro Grande, a small settlement on the banks of the Mojave River in southern California. Other larger sand and gravel and ready-mixed concrete operations in California are owned by the same interests. Neal O. Baker, J. G. Mitchell and George Thwing, Jr., operate Triangle Certified Concrete, Inc., and the Triangle Rock & Gravel Co. at San Bernardino. The Fontana Gravel Co., Fontana, Calif., is an affiliate concern.

Although the Oro Grande plant is primarily devoted to supplying aggregate for the George Air Base near Victorville, important transcontinental highway improvements are under way in the general area. It is a comparatively simple plant with a 25- x 40-ft. Cedarapids primary jaw crusher fed by an apron feeder. Three sizes of washed gravel are produced and one size of sand, using twin 24-in. Conveyor Co. sand screws. Base material, plaster and mortar sand and stone can also be produced to desired specifications. Each screw is driven by its own drive motor through gear reduction units. A 3-ft. Traylor "Ty" gyratory handles the secondary crushing with the throughs returned to the first belt conveyor. Nominal capacity is 300 t.p.h. The plant operates wet. Water from a company-owned well on the bank of the Mojave river is pumped to the plant a distance of about 3000 ft. Used water is held in a tailing pond alongside the plant.

(Continued on page 86)

Large capacity truck dumping to apron feeder ahead of primary jaw crusher

Close-up of secondary gyratory crusher with sand screws, to the left, and screening section, to the right, above



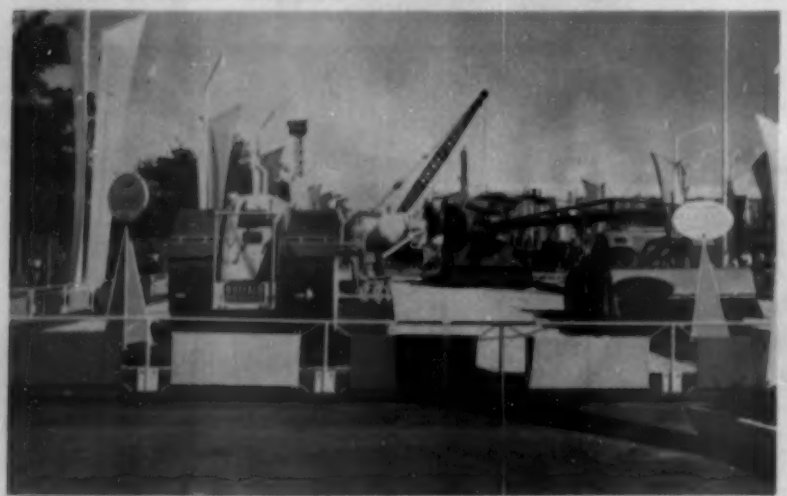
Twin crawler, 384-hp. tractors and heavy-duty trucks from 10 to 50-ton capacity performing at the Powerama stage show which was called the world's first technological circus

"Powerama" Dramatizes Diesel Power

• General Motors stages a "World's Fair of Power" in Chicago to celebrate production of 100 million horse-power in diesel engines this year

CALLED THE "WORLD'S FAIR OF POWER," the General Motors Powerama was held in Chicago, Ill., August 31 to September 25 to celebrate the production this year of the corporation's 100 millionth diesel horsepower. The important role of diesel (and also gas turbine) engines in America's industrial economy was dramatized in the more than 250 exhibits sponsored by ten of the G.M. divisions and in an impressive stage show, featuring the world's first technological circus. The power extravaganza was staged on a 20-acre site fronting Lake Michigan—the same site as the Century of Progress in 1933-34.

Recognizing the nation's need for more and better roads, General Motors presented an informative road building exhibit. Sponsored by the Detroit Diesel Engine Division, the exhibit centered around sections of portland cement and bituminous concrete highways in various stages of construction. Practically every type of road building equipment—from earth movers to pavers—was displayed. Each unit was realistically posed at stations ranging from rough terrain to finished pavement. Among the equipment displayed were a Euclid crawler tractor, truck and scraper, an Ingersoll-Rand rotary drill, a Bay City dragline, a Pettibone-Mulliken Speedall front-end loader, a G.M.C. truck, a T. L. Smith transit mixer, a Koehring paver, and a Seaman Pulvimixer. A road grader, tamper, roller, ditcher, and asphalt paver were also shown.



Highway exhibit showing sections of bituminous, left, and portland cement concrete, right, highway pavement in various stages of construction with practically every type of road building equipment on display

Two other Detroit Diesel exhibits of special interest were a portable Cedarapids Commander crushing and screening plant powered by a 300-hp. Detroit 110 series diesel engine, and a 30-ft. carrousel displaying scale models of virtually every type of road-building and construction equipment.

Other Detroit Diesel exhibits included a cotton gin, saw mill, and an oil well drilling rig—all in actual operation, and a Florida shrimp boat. Farm exhibits featured plowing demonstrations, a portable feed mill, and an irrigation system.

The Euclid Division also played an important role in Powerama by demonstrating its complete line of earth-moving equipment at the stage show, including the new 388-hp. twin crawler TC-12 tractor, a smaller C-6 crawler tractor shown for the first time, rear-dump and bottom-dump hauling units of 10- to 50-ton capacity, and scrapers (including the overhung engine and twin-engine types) of 7- to 18-cu. yd. capacity. A highlight of the stage show was the Mambo dance per-

(Continued on page 140)

Recently opened Quigley plant, showing belt conveyor system extending over large stockpile area with screening and classifying towers, to the right, producing sand and gravel

Efficient SAND RECOVERY System

At New Quigley Plant of Fort Worth Sand and Gravel Co.

COMPLETELY AUTOMATIC IN OPERATION, the new Quigley plant of Fort Worth Sand and Gravel Co., employs modern production techniques and equipment. It is located one-half mile south of Highway 183 at Hurst, Texas. The Quigley plant will produce a complete line of aggregates for every concrete, masonry and plaster requirement.

Stripping and loading at the gravel pit is done by three 1½-cu. yd. draglines. Raw material runs approximately 50 percent sand and 50 percent from ¼-in. to 3-in. gravel. Hauling is done with three 21-ton bottom-dump Euclids.

Raw material is dumped by trucks to a 24- x 36-ft. concrete receiving hopper with a capacity of 120 cu. yd. The 245-ft. belt conveyor, which supplies the plant or classifying tower, operates at 375 f.p.m., and has a capacity of 245 t.p.h. In the plant, the material goes first to a 3- x 8-ft. two-deck scalping screen equipped with a 3-in. square mesh wire to scalp out all plus 3-in. material, before it enters the revolving screen.

The 8- x 20-ft. Telsmith rotary screen has a 4-ft. scrubber section. The outside sand jacket removes sand, which flows into the water scalping tank. At the head of the revolving screen, water is introduced at the rate of 750 g.p.m. for washing and separation. An inside barrel with a ⅜-in. dia. round perforated screen allows the ¾-in. material to fall on the wire mesh sand jacket to remove the sand. All fine material passing through the wire mesh jacket in the rotary screen is discharged into a 10- x 20-ft. Eagle water scalping tank. Here excess water is removed, undesirable size material is disposed of, and fines are retained through a large settling area.

The fine sand settles out and is discharged through the gates into two Eagle sand screws, one single and one double, in which sand from the scalping tank is rewashed and dewatered.

Coarse material is fed into a 36-in. Eagle log washer, where another 100 g.p.m. of fresh water it added. The remainder of the coarse aggregate goes into the 24-in. coarse material screw; 300 gal. of rinsing water is added.

A 204-ft. belt conveyor takes gravel from the classifying tower to the screen tower, where the sizing of the aggregate begins. A double-deck vibrating screen with 1¾-in. square openings on the top deck and ¾-in. square openings on the bottom deck takes off the 1¾-in. to 3-in. and the ¾-in. to 1¾-in. gravel sizes, which are carried by belt conveyors over the reclaiming tunnel to the stockpiles. The remaining material, or minus ¾-in. gravel, transfers to another belt conveyor and goes to the No. 2 screen tower, where three other sizes are produced; ¾-in. to ½-in., ½-in. to ¼-in., and ¼-in. to No. 8. All these materials are moved by belt conveyor to stockpiles which have a capacity of approximately 70,000 cu. yd.

The reclaiming tunnel is a 535-ft. long reinforced concrete structure, with bin gates every 10 ft. for loading out and blending different types of material to meet any required specifications. The reclaiming belt conveyor runs from the back end of the tunnel and projects out the other end approx-

(Continued on page 102)

Overall view of crushing and screening plant with stockpiling system to the left

PUSH-BUTTON Controlled Stone Plant

• One man controls all equipment from surge pile through stockpiling in Henry J. Kaiser Co. stone plant near Clayton, Calif. Install dust control system

SEVERAL FEATURES of the new Henry J. Kaiser Co. quarry and crushing plant near Clayton, Calif., are unusual. The quarry is about 650 ft. above the plant, the stockpiling system is push-button controlled by one man, and the dust control system is designed to reduce dispersion of dust to a minimum. Clayton is about 30 miles east of Oakland.

The plant is of steel and concrete construction, with the exception of stairs, walkways and field conveyor supports. The plant was designed by the engineering department of the Henry J. Kaiser Co., sand and gravel division, with Jack Heck as designing engineer of this project. Bart Carter was in charge of construction. The immediate site of operations is on Mt. Zion.

Before starting construction, the company spent a year diamond drilling the site. The rock being quarried is a hard, durable stone classed as a diorite. It is a dark colored, fine-grained, igneous rock suitable for both concrete and bituminous construction.

Vern Klein at the control panel from which all equipment from surge pile through stockpiling tripper is controlled

Quarry-Drilling

The quarry, which is located about 700 ft. from the hopper serving the primary crusher, is operated from two benches. The top bench is 43 ft. high and the lower bench is 50 ft. Two General Motors trucks, Model AC-X-894, and two Euclid, all 15-ton capacity and rear dump design, haul from the quarry floor to the crusher. Loading is done with a No. 80 Northwest equipped with a 2½-cu. yd. bucket.

Primary drilling is done with a Joy "Challenger," drill. This is a self-propelled rubber-mounted unit, with hydraulically operated levelling jacks. The machine drills a 4-in. dia. hole, and is an air operated percussion type drill. The rock is a brecciated diorite that tends to break at the fracture zones. Drilling is at the rate of 35 ft. per hr. Holes are loaded to within about 15 ft. of the top with 40 percent Hercules dynamite and exploded electrically. The Joy drill uses 20-ft. lengths of 2-in. dia. steel with threaded joints. A ¾-in. dia. air hole penetrates the drill steel. At the cross bit there are five air outlets, each about ⅜-in. dia. The Joy drill bit in use is a cross-type bit with two of the cutting edges slightly longer

Lawrence Wilber, superintendent

Secondary and final crushing plant. To the right may be seen a 5½-ft. short head and back of it, a 4¼-ft. standard cone crusher

By WALTER B. LENHART

than the other two. The short arms are adjacent to each other. Two 500-c. f. m. Chicago Pneumatic portable compressors are available to supply air to the drill. One compressor will not quite carry the load. The holes are loaded with 3½- x 16-in. 40 percent Hercules dynamite and/or No. 2 Gelamite, depending on rock conditions. Standard electric caps or No. 1 and No. 2 short delay electric exploders are used. Powder is placed in the holes on the basis of 0.6 lb. per cu. yd. Holes are drilled on 8-ft. centers and 10-ft. burden. Due to the brecciated nature of the diorite, fragmentation is good for the most part, however, an occasional large piece remains unbroken and is pushed to one side for later attention.

The quarry floor is kept clean by a D-8 Caterpillar tractor equipped with an American Tractor Co. ripper. This rugged equipment is bolted to the end opposite to the dozer blade. It has been powerful enough to loosen the 20 ft. of overburden over the main deposit. The overburden is a semi-consolidated dioritic material but the ripper easily loosened the material, permitting its removal without blasting. The ripper also was used in building roads to the quarry, surge pile, transfer station and for excavations at the plant site. This work involved the removal of about 45,000 cu. yd. of material which would have had to be blasted if the ripper had not been used.

Crushing and Screening

The primary crusher, located near the quarry, is fed by a reciprocating Sheridan type feeder having heavy steel bars as the main elements. A system of belt conveyors deliver the stone to the plant, placing it in a surge pile well above the plant site in a small ravine that nature has cut in the side of Mt. Zion. There are three main belt conveyors plus a shorter belt conveyor. The short conveyor has a flat running 42-in. belt located under the 36- x 48-in. Allis-Chalmers primary jaw crusher which is driven by a 150-hp. motor. This belt conveyor unloads to a belt conveyor, 575-ft. centers, that delivers to a 30,000-ton capacity surge pile. From the surge pile, another belt conveyor, 600-ft. centers, carries material to a transfer station where a second belt conveyor, 750-ft. centers, carries the minus 4-in. stone to the plant. All belts are American Rubber Co. units and, with the exception noted, are 30 in. wide. Conveyors ahead of the surge pile are designed to handle 400 t.p.h. and 300 t.p.h. following the surge pile. A heavy duty Syntron feeder operates in the 9-ft. dia. pipe tunnel under the surge pile. Belt conveyors are driven with Fairbanks Morse and General Electric motors through Pacific Western gear reducers. Conveyors are equipped with electrically driven, hydraulic-operated Thrustor brakes. With a down-grade load the braking action from the motors feeds current back into the line.

The secondary and final reduction crushers are Symons 5½-ft. short head

Plan of crushing, screening, and stockpiling facilities with connecting belt conveyor system

Return belt conveyor in foreground with belt conveyor to final screens on top of bin, inclining up to the right. The four-compartment bin has a capacity of 500 tons; below the bin is an arrangement for making a slurry in preparing road base material with up to 6 percent moisture in the finished product

Under the four-compartment bin are four clam-type gates, each having two water sprays for use when making road base slurry continuously

with 200 hp. motor and a 4¼-ft. standard cone crusher with a 150 hp. motor. The larger motors use 2300 volts. Over the cone crushers is a steel structure supporting a crawl and Safeway Wright chain blocks that ride a heavy steel "I"-beam. The installation permits a crusher to be torn down in 4 hr.

The scalping screen ahead of the cone crushers is a 5- x 12-ft. Allis-Chalmers Ripl-flo two-deck vibrating screen, operated dry. The two cone crushers are placed in a line with the off-bearing belt conveyor. This 30-in. belt conveyor, on 175-ft. centers, delivers to two Allis-Chalmers Ripl-flo screens mounted back-to-back and in series atop a four-compartment, steel cylindrical bin from which all material is stockpiled. The two screens, one 5- x 12-ft. and one 5- x 14-ft., over the four-compartment bin are Allis-Chalmers Ripl-Flo screens, operated dry. Oversize from this screening section is moved back to the Symons cones by belt conveyor.

Stockpiling System

There are no bins in the plant for truck loading, and all material in the four-compartment bin is ground stored by a travelling tripper. The tripper is a company-made machine which is mounted on standard railroad trucks that were formerly used by the Six Companies, one of the Kaiser affiliates that built Boulder (Hoover) dam on the Colorado River. The tripper has a boom at right angles to the main belt which is about 65-ft. long. The tripper uses 24-in. belts and can unload to a storage area some 650 ft. long.

The sizes of stone normally produced are: 2½-in. to1½-in.; 1½-in. to ¾-in.; ¾-in. to ½-in.; ½-in. to ¼-in.; and minus ¼-in. to dust. However, blends of these sizes can be easily made so as to meet any reasonable specification.

As no railroad serves the plant, trucks are loaded from the ground stored piles by a 2½-cu. yd. Michigan loader and two Northwest shovels, a No. 6 with a 1½-cu. yd. bucket and a No. 25 with a ⅝-cu. yd. bucket. Both are diesel driven, using Caterpillar engines.

On top of the four-compartment bin is a penthouse that encloses a control panel where one operator operates all equipment from the surge pile through the stockpiling tripper. This includes the tunnel feeder under the surge pile, secondary crushers, belt conveyors and screens. The panel was designed and built by electricians of the Henry J. Kaiser Co.

Make Road Base Material

One feature of the plant that is of more than passing interest is the method used to make the so-called "Road Slurry," or Road Base material. This crusher run product is minus 1½-in. material. It has to contain up to 6 percent moisture to aid compaction. At the Clayton plant, material in the four-compartment bin discharges through four clamshell-type gates arranged in two groups of two over the storage

All material is stockpiled by the movable stacker which is controlled by a single operator in the plant control tower

Pete Nolesco, plant foreman, left, and **Oscar Peterson,** quarry foreman

belt conveyor. At each gate are two water sprays or a total of eight. The blend size is obtained by setting each gate at the desired opening. Weights are judged by calculating the speed of belt, its length and load factors to get an adequate t.p.h. figure. Water is accurately controlled through a Rockwell meter ahead of the sprays. As the material is fed to the belt conveyor, it is wetted by the fine sprays, falls to a small steel receiving hopper and thence to the off-bearing belt conveyor and ground stored.

Dust Control

Dust is controlled in the new plant by the use of the Johnson-March Co. system. This system incorporates the use of a liquid chemical that is mixed with water and sprayed onto the coarser materials. The chemical used is a so-called "wetting agent" that reduces surface tension in the rock to a point that wetting water can get into the smallest fracture planes of the rock. These fracture planes are the future sources of dust. By use of the wetting agent the dust is actually wetted before it is made. About one gallon of the water chemical mixture is used per ton of rock. One part of the wetting agent is added to 750 parts of water. Fine sprays are installed ahead of the scalper screen where the minus 4-in. stone is first wetted; sprays also are ahead of and follow the two cone crushers. The cost of the dust control system is about $12 per day, based on a production of 3000 tons. The Johnson-March Co. field engineers make periodic inspections and keep the sprays in operating condition. The dust reduction by the use of the system is well above California's industrial requirements, and to the eye is surprisingly good.

It is expected that a water supply will be developed near the plant and at that time the company will put in washing equipment. At the time of inspection water was being hauled in. Three steel water tanks with a capacity of 60,000 gal. are available for the J-M dust sprays and for the slurry operation.

The control room, primary and secondary crushers, transfer station, tunnel under surge pile and the office are all interconnected with a "Sound Power" phone system. All material from the plant is weighed on a Murphy truck scale.

R. S. Barneyback is vice-president of the Henry J. Kaiser Co., Lawrence Wilber is plant superintendent, Oscar Peterson is quarry foreman and Pete Nolasco, plant foreman. Ivor Thomas is assistant to Mr. Barneyback with headquarters in the Oakland offices of the Henry J. Kaiser Co.

Quarry view showing drill operating in upper bench with haulage unit and tractor equipped with ripper, below

The 36- x 48-in. primary jaw crusher is near the quarry. Belt conveyor delivers to surge pile and then to plant

Dust control equipment in the secondary and final crushing plant

View of the Somerset quarry and plant taken during the Open House in August. The new plant, with its stockpiling conveyors, is in the foreground; the older plant to the rear

Triple Capacity of Crushed Stone Plant

• Somerset Crushed Stone, Inc., holds Open House to celebrate completion of $400,000 addition to Bernardsville, N. J. plant and tenth anniversary of ownership

By KENNETH A. GUTSCHICK

IN OPENING UP A NEW $400,000 PLANT ADDITION at its Bernardsville, N. J., quarry, Somerset Crushed Stone Inc. has nearly tripled plant capacity. The new installation, which is located on the quarry floor and tied to the company's older plant through a tunnel belt conveyor, was formally dedicated at an open house celebration held in August*. This affair also marked the tenth anniversary of the ownership of the 58-year-old Somerset quarry by Anthony Ferrante, well-known New Jersey producer and former contractor. Since the change in ownership in 1945, capacity of the original plant had been stepped up tenfold (to 3000 t.p.d.) without changing the primary jaw crusher, and with the opening of a new primary crusher and other facilities, production is expected to reach 8000 t.p.d.

*See ROCK PRODUCTS, September, 1955, p. 68.

Toe hole drilling with wagon drills and 315 c.f.m. air compressors

The new plant is simple in layout, consisting of a 36-in. primary gyratory crusher, a double-deck scalping screen, a secondary gyratory crusher, a tunnel belt conveyor, a triple-deck screen, and four stacker belt conveyors. The tunnel conveyor delivers a minus 6-in. product from the secondary crusher to the old primary belt conveyor. The old plant remains unchanged, although plans call for relocating the primary jaw crusher adjacent to the new 36-in. gyratory. Under this arrangement, it will be used as a spare, discharging its product to the new primary belt conveyor.

The quarry, developed on a hillside,

penetrates a hard massive steeply-dipping traprock formation (Triassic age) which has typical columnar jointing. The working face varies between 80 and 110 ft. Overburden consists of a stony top soil 1 to 4 ft. thick which is underlain by a 5-30 ft. thick zone of highly weathered traprock. Soil is stripped off separately by a 2-cu. yd. crawler-type Osgood dragline and sold for fill. The weathered stone is highly fractured, and can be loaded directly to trucks by a 2-cu. yd. Lorain shovel. Having good gradation (ranging in size from 3-in. to dust) and a natural clay binder, this material is ideal for road base and shoulder work. In one year, over 400,000 tons were marketed.

Both vertical blast hole and toe hole quarry drilling methods are used, depending upon the dip, strike, and jointing of the traprock strata. Where the quarry face roughly parallels the strike of the formation, toe hole drilling and blasting loosens the face. Elsewhere conventional blast hole drilling or occasionally a combination of the two methods is required.

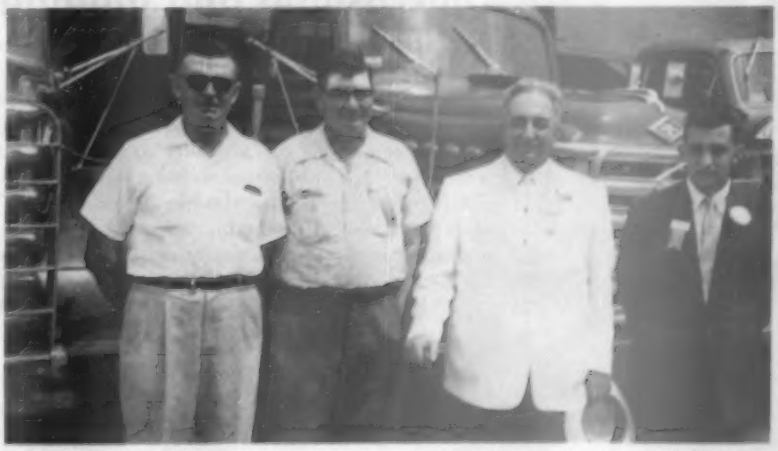
Vertical drilling is done on contract with a Reich rotary drill handling 6¼-in. Hughes Tri-cone bits. The drill is mounted on an L190 International truck and driven by a Cummins truck engine through power take-off. A 400 c.f.m., low pressure (15 p.s.i.) Allis-Chalmers air compressor supplies air for removing cuttings and ground water. The drilling rate (including time for moving, changing drill steel, etc.) averages 8½ f.p.h., which is several times greater than churn drilling used earlier. Holes are drilled on 18- x 18-ft. centers and 8-10 ft. below the quarry floor.

Primary blast holes are loaded with Hercules 5-in. cartridges, 60 percent gelatin being used as the bottom charge and 40 percent gelatin in the deck loading. From 2 to 8 holes, in a single row, are shot each time. The charge is detonated with millisecond delay caps and Primacord. As required by state regulations (Dept. of Labor and Industry), all primary blasting is supervised by a licensed blaster, which in this case, is the explosive company representative. These regulations, designed to control vibration to within safe allowable limits through use of scientific blasting methods, empower the state rather than local governing bodies or individuals to restrict quarrying due to any blasting violations.

Toe hole drilling is handled by two Worthington wagon drills, each operated in conjunction with a portable 315 c.f.m. Schramm, Ingersoll-Rand, or Worthington air compressor. Holes are drilled on 5 to 9 ft. centers, and in three rows; these are located at

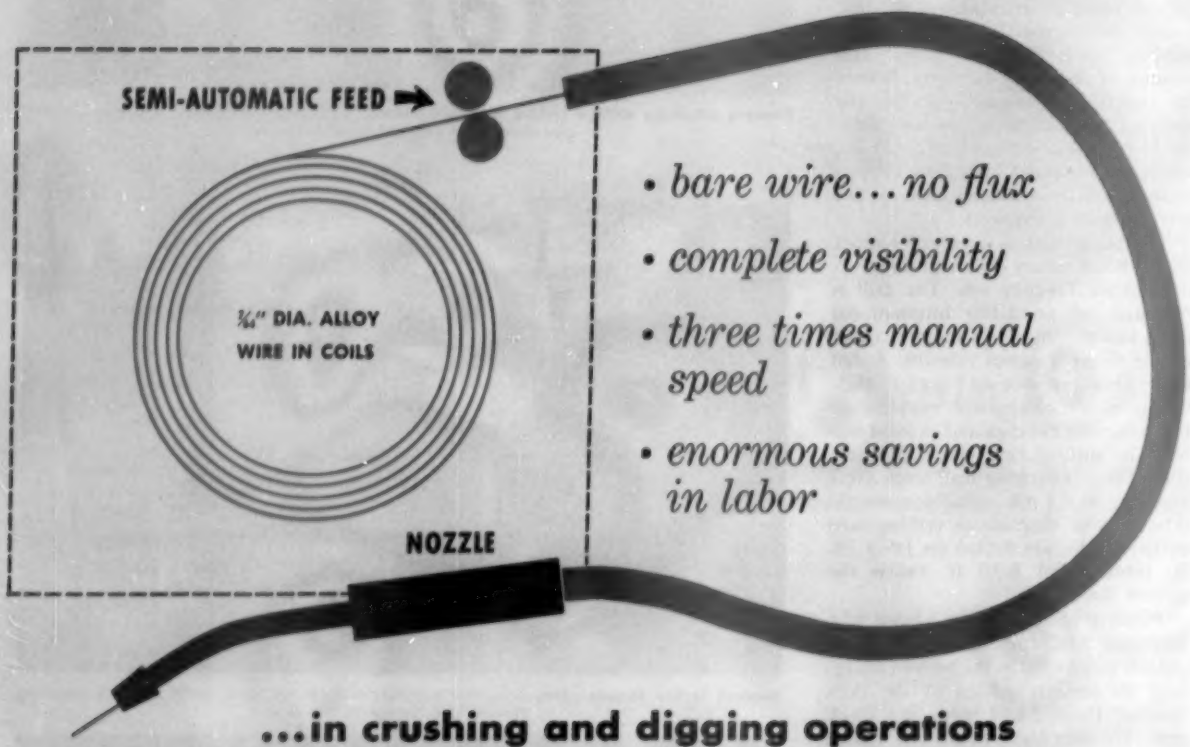
Primary crushing station before it was enclosed. Cribbing wall protects ramp. Trucks can dump into sides of crusher hopper

Modern locker-shower room and new substation in foreground, with primary crushing station and garage to the rear



Left to right: Elmer Hess, Peapack plant superintendent; Fred Dolsen, Bernardsville plant superintendent; Anthony Ferrante, plant owner; and James A. Ferrante, vice-president

SEMI-AUTOMATIC with the NEW Alloy Tubular



...in crushing and digging operations

This is a totally new hard-facing method utilizing the welding speed of the semi-automatic machine to produce sound deposits of wear-resistant alloys. The wires run bare, using no flux, so that the weldor enjoys full visibility at all times...deposition rates at normal welding currents (200 to 300 amps) are double or triple those of the manual method...standard semi-automatic equipment is easily converted to handle Stoody wires.

Maintenance time and welding costs are reduced through increased service life provided by Stoody alloys and the greatly increased welding speed. Weldors like the semi-automatic, find it easy to operate with less fatigue.

Your Stoody dealer (check the "yellow pages" of your phone book) will be glad to give you full information, plus a demonstration on your own equipment without obligation. Or write to the company for literature and the name of your nearest dealer.

STOODY COMPANY

HARD-FACING

Stoody Wires

ALL TYPES OF CRUSHERS: *Ideal applications for Stoody 100 because of excellent wear resistance and impact strength. Semi-automatic application greatly speeds welding.*

Stoody 100 ...a high chromium alloy wire for equipment subject to severe abrasion and impact. This is similar to Coated Tube Stoodite. Used on crushers, buckets, rippers, augers, tool joints. Deposits 10 to 18 pounds per hour.

Stoody 121 ...a medium alloy material with excellent resistance to abrasion and impact. This is similar to Stoody 21. For bucket teeth, shovels, grizzlies, loader lips, crushers. Deposits 9 to 16 pounds per hour

Stoody Nickel Manganese ...produces a Hadfield manganese deposit for build-up of all manganese parts—crushers, buckets, shovels, teeth—preparatory to hard-facing. Deposits 4 to 7 pounds per hour

11929 EAST SLAUSON AVE. • WHITTIER, CALIF.

SHOVEL TRACK PADS: *Use of Stoody Manganese applied by semi-automatic welder cuts time on maintenance*

SHOVEL BUCKETS: TEETH, LIPS, ADAPTERS, ETC., *Stoody 121 gives good wear resistance, quickly covers wearing areas on all buckets.*

BULLDOZER END BITS: *Can be hard-faced in one third of time required by manual process. Stoody 121 is recommended.*

CONVEYOR SCREWS: *Semi-automatic welding cuts time and labor on large surfaces. Stoody 100 is used for best wear resistance.*

floor elevation, 4½ ft., and 9 ft. above the floor. Bottom holes are angled downward, middle holes are perpendicular and top holes are angled upward. The drill steel, supplied by Brunner & Lay, is 24 ft. long, 2½- and 3-in. diameter, and fitted with Carbide Rok-Bits. Holes are loaded solid, except for 10 ft. of stemming, with Hercules 2-in. cartridges (60 and 40 percent gelatin). No. 1, 2 and 3 delays are used on the top, middle, and bottom rows, respectively, for detonation. From 30 to 150 holes are shot at one time. A Northwest crane carrying a 5000-lb. drop ball is used for secondary breakage.

Three diesel shovels handle quarry loading, including a 2½-cu. yd. Manitowoc, a 2-cu. yd. Lorain, and a 1¾-cu. yd. Osgood. Five 22-ton Euclid trucks haul to the plant, the maximum haul being less than 1000 ft. Other quarry equipment includes an International TD18 tractor-bulldozer for quarry clean-up and an Austin-Western grader for road maintenance.

New Facilities

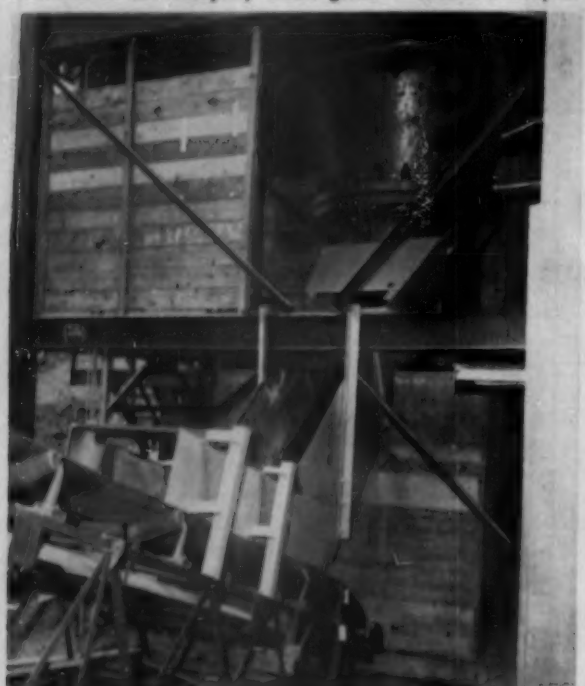
Access to the new primary crusher is via a ramp supported on one side by a cribbing wall. Trucks dump into the steel crusher hopper from two sides. The primary crusher is a 36-in. Kennedy-Van Saun gyratory which is driven by a vertically-mounted 200-hp. Crocker-Wheeler motor through Gates V-belts. A Bristol recording ammeter installed in the company office gives a continuous record of the crusher motor load, and is used to prevent overloading and to check operating time; it has a range from 0-300 amps. Indicating ammeters are used on other crusher motors in the plant.

The minus 12-in. crusher product is carried on an inclined 42-in. x 140-ft. belt conveyor to a two-deck 5- x 14-ft. Hewitt-Robins heavy duty Vibrex scalping screen. The top deck has ¾-in. perforated plate with 6-in. square openings, and the bottom deck has woven wire cloth with 3-in. openings. Oversize stone is reduced to minus 6 in. by an Allis-Chalmers 8K gyratory crusher, which is V-belt driven by a 100-hp. Allis-Chalmers motor. Bottom deck rejects by-pass the crusher and join with the crusher product, to be transferred to the old plant for further processing. The tie-in is via a horizontal 42-in. x 72-ft. belt conveyor leading to the old primary belt conveyor.

This connecting conveyor, passing under the quarry haulage roadway, is housed in a 42-ft. tunnel made from two discarded 11-ft. dia. asphalt tanks. These tanks, built of ¾-in. riveted steel, were set on concrete footings, enveloped with reinforced concrete, and then backfilled. Use of this method enabled tunnel construction to be completed over a weekend, preventing any loss of operating time. Another interesting feature at this point concerns the dual product feed to the tunnel conveyor. To reduce the feed velocity and thus increase belt life, the crusher bypass and crusher discharge chutes intersect at nearly right angles.

Minus 3-in. stone from the scalping screen is transferred to the second screening tower by a short 30-in. belt conveyor, followed at right angles by a 30-in. x 118-ft. inclined belt conveyor. The finish screen is a 5- x 14-ft. Kennedy-Van Saun three-deck unit, having deck openings of 1⅜ in., 1 in., and ⅝ in., respectively. The top deck is made of perforated plate. Finished products are A 2½ in., B 1½ in., B ¾ in., and screenings. (A refers to stone used for concrete aggregate, B to road stone). These products are delivered to stockpile by means of inclined 24-in. belt conveyors, having 173-, 72-, 140-, and 93-ft. centers, respectively. Total stockpile capacity is 500,000 tons.

Conveyors and conveyor belting were supplied by Hewitt-Robins, and all motors except the secondary crusher motor are Crocker-Wheeler. Conveyors are V-belt driven through American speed reducers or through chain and sprocket. All inclined conveyors are fitted with automatic ratchet-type backstops, and anti-friction roller bearings are used on pulley shafts and idlers. Rubber-cushioned impact idlers are used at loading points; training idlers are also of rubber construction. All belting is 4-ply, with 42-in. belting weighing 42 oz. with $\frac{3}{16}$- x $\frac{1}{16}$-in. covers and all other belting of 28 oz. construction with $\frac{1}{16}$- x $\frac{1}{32}$-in. covers.



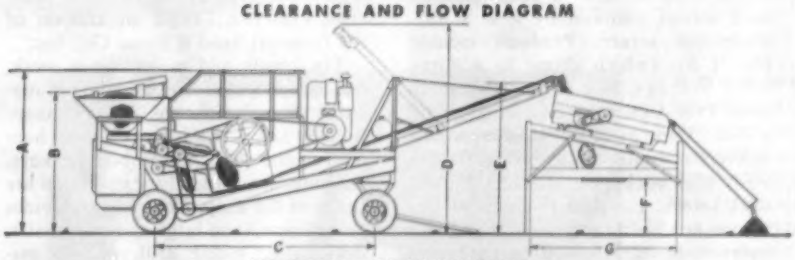
The 36-in. primary gyratory crusher is served by a 42-in. belt conveyor. Note rubber impact idlers at loading point of belt **Secondary gyratory crusher,** right, discharges minus 6-in. stone to

42-in. tunnel belt conveyor leading to primary belt conveyor in old plant. Note intersection of crusher bypass and crusher discharge chutes to reduce feed velocity to belt

AUSTIN-WESTERN
PORTABLE CRUSHING PLANT

"61"

CLEARANCE AND FLOW DIAGRAM



CLEARANCES—MODEL "61" PLANT

A—Traveling Height.....11'-2"	E—Height at Center of Head Drum.....10'-5"
B—Loading Height..... 9'-8½"	F—Height Under Screen Mounting Frame to Ground..... 2'-8"
C—Wheelbase .....15'-0"	G—Length of Screen Mounting Frame.....Approx. 10'-9"
D—Height with Conv. Folded .....14'-5"	

COMPARE
then you'll specify
AUSTIN-WESTERN

DESIGNED FOR SMALL PROJECTS

Austin-Western "61" Portable Crushing Plant is especially engineered for the smaller projects such as county, township and municipal road building and maintenance. Because of its sturdy construction and stability, the "61" is adaptable to use wherever needed. When equipped with a 1024 Jaw Crusher the entire plant, less power, weighs approximately ten tons. The heavy welded channel frame requires no jacks. Dual rear tires give the plant great stability. The plant is equipped with a 24" x 26' channel frame delivery conveyor having a discharge height of 10'-5". With an Austin-Western "61" Plant you have greater portability, speedier set-up and higher production.

Welded steel plate crusher frame for high strength without weight of cast steel frame.

Machined steel toggle plate for absolute protection of crusher.

Inclined positive-throw type vibrating screen.

All bearings are anti-friction type.

Dual wheels are used on rear for added stability.

All drives are V-belts and fully enclosed gears.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

Austin-Western
CRUSHING, SCREENING and WASHING EQUIPMENT

BALDWIN-LIMA-HAMILTON CORPORATION
Construction Equipment Division
LIMA, OHIO, U.S.A.

Construction Equipment Division

The new plant addition was designed by company officials. The structural steel screening towers were built and supplied by Sy-Co. Corp., Lyndhurst, N. J. Building construction was started on May 17, and had to be dove-tailed with operation of the old plant. A new substation incorporating three single-phase Pennsylvania 500-kv.a. transformers supplies 440-volt current for plant use, with controls centralized in a new switch house. The old plant is still served by three 250-kv.a. transformers.

Chute construction is of special interest. The majority are built with soft wood (2-in. boards) and lined with ⅝-in. armor plate; this was found to be the most practical after years of operating experience. However, discarded I-beams are also used as chutes for long spans, e.g., there is one leading from the primary crusher and two from the scalping screen, also one in the old plant. To insure long life, either discarded railroad track rails or old shafting is welded to the chute wearing surface. Stone boxes, also of steel-lined wood construction, are installed ahead of the two screens.

Original Plant

The older Somerset plant consists of a 36- x 24-in. Farrel-Bacon jaw crusher and 4- x 15-ft. apron feeder and two screen houses, designated "B" and "A," each having multiple bin storage. The B building, which follows the primary crusher in the flow sheet, incorporates two gyratory crushers, a Cedarapids double-roll crusher, and four vibrating screens; the A building has three screens and a gyratory crusher. Kennedy-Van Saun supplied the gyratory crushers and five of the screens, and the others are Hewitt-Robins.

Minus 6-in. stone from the new plant is delivered to the B building by a 30-in. x 190-ft. inclined belt conveyor. A 5- x 12-ft. triple-deck scalping screen and a 5- x 12-ft. double deck screen in series produce 2½-, 1½-, ¾-, ⅜-in., and stone dust sizes. Oversize stone (plus 3 in.) from the scalping screen is fed to a surge bin ahead of two gyratory crushers, while ¾-in. stone from bin storage is fed to the 30- x 22-in. double-roll crusher. One gyratory (a No. 37½) delivers a minus 1⅜-in. stone to a 24-in. x 125-ft. inclined belt conveyor leading to the A building. The other gyratory (No. 38) and roll crusher discharge their products (minus 1⅜ in. and minus ½-in., respectively) to individual 65-ft. high bucket elevators which lead to a 5- x 12-ft. triple-deck screen followed by a 3½- x 6-ft. double-deck screen. Finished products of this circuit include 1½-, ¾-, ½-, ⅜-in. and stone dust sizes.

A 2-cu. yd. dragline removing top soil and a 2-cu. yd. shovel excavating the weathered trap rock overburden. Both products are marketed

Minus 1⅜-in. feed to the A building is sized on a 4- x 10-ft. double-deck screen followed by a 4- x 8-ft. triple-deck screen. Products include plus 1 in. (which drops to a surge bin), ¾-, ½-, ⅜-, ¼-in., and stone dust. Plus 1-in. stone is recrushed by a No. 37½ gyratory crusher which delivers a minus ½-in. product via a 90-ft. high bucket elevator to a double-deck screen. Finished products of this screen are ⅜-in. and stone dust, with oversize being returned to the surge bin.

Other Operations

The company also operates a Cedarapids portable crushing plant, which consists of a jaw and roll crusher and a vibrating screen. This plant is used occasionally to turn out special sizes. One product is a minus 2-in. road base stone made from the weathered trap rock, which is bulldozed over the quarry face to the floor and fed to the plant by power shovel. It also produces ⅜-in. chips and agricultural limestone at Somerset's other quarrying operation at nearby Peapack, N. J. This operation, which was purchased in 1947, consists of a dolomitic limestone quarry, stone plant, and lime plant. Principal products are concrete aggregates, agstone, pebble lime (burned in two 12-ft. dia. shaft kilns), and hydrated lime.

Somerset also has a 2-ton batch F. D. Cummer hot and cold bituminous concrete plant at Bernardsville, which was installed in 1949. A dry-batch ready-mixed concrete plant is also located on the quarry property. Formerly owned by the company, this plant is now operated by the Colonial Somerset Concrete Corp., an affiliate of the Colonial Sand & Stone Co., Inc.

For repair and maintenance work, the company has a well-equipped machine shop and garage. All but exceptionally heavy repair work can be handled in the shop. Large bolting, keys, shafting, etc., needed for operation are made in the shop. Equipment includes three lathes (two large and one small), drill press, radial drill, milling machine, power shears and saw, band saw, grinder, two welding machines, air compressors, etc.

As part of the recent expansion program the company erected a modern concrete block shower and locker room for its 70 employes. Floored with asphalt tile, the service building consists of seven shower stalls, two large circular wash basins, several toilets, etc. This building also houses a modern, complete infirmary where immediate first aid treatment may be given.

The firm operates a large fleet of delivery trucks. For hauling jetty stone to Atlantic coastal cities, Somerset has pioneered the use of flatbed trailers; it has 12 of these trailers with Mack or G.M.C. chassis. Shipments to Atlantic City (125 mi.) are as high as 4000 tons daily. Aggregates are hauled in a fleet of 15 company-owned dump trucks and from 50 to 75 hired trucks. The road truck fleet includes three Highway and Mack dump trailers, eight G.M.C. and two Diamond-T tandems, and two G.M.C. four wheelers.

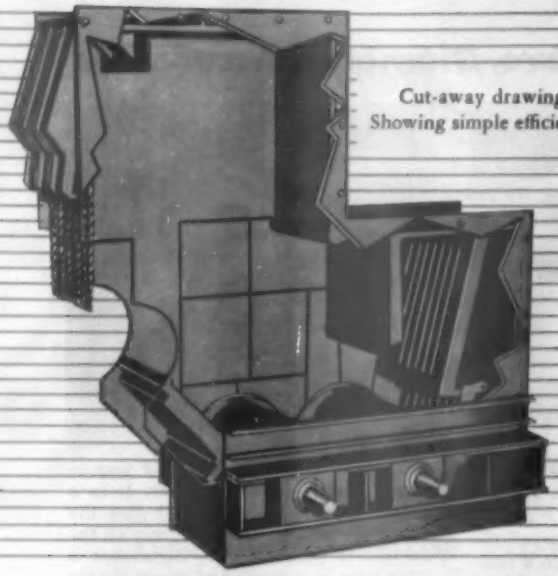
(Continued on page 86)

GIVE YOUR AGGREGATE PRODUCTION A "LIFT" WITH

KENNEDY CUBER SENIOR MODEL 3648

A new Multi Stage, Regulated Flow Impact Breaker For Primary and Secondary Crushing.

Dual Rotor — Triple Action PORTABLE OR STATIONARY Models



Cut-away drawing
Showing simple efficiency

MAXIMUM CAPACITIES
(in tons per hour)

CLOSED CIRCUIT

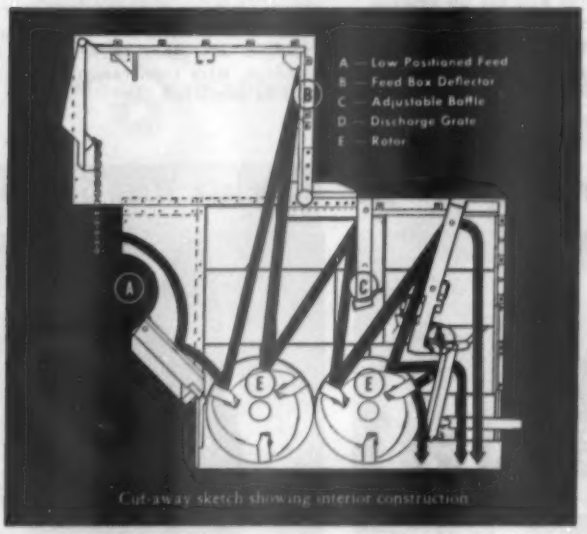
Minus 3 330
Minus 2 275
Minus 1 150
150-250 HP Required

PRODUCT GRADATION

AVERAGE LIMESTONE
(Figures noted are percentages of product passing)

PRODUCT SIZE	HAMMER VELOCITY in feet per minute		
	5500	7000	9000
3"	94%	98%	
2½	93	98	
2½	92	97	
2¼	91	96	
2	87	95	99%
1¾	84	94	98
1½	76	90	97
1¼	67	84	93
1	54	76	86
¾	42	60	74
½	28	46	61
¼	16	30	45

Under certain circumstances, the Kennedy CUBER SENIOR can be easily adjusted to produce higher percentages of coarse cubical material. For further information, consult with Kennedy factory engineers.



Cut-away sketch showing interior construction

A KVS DESIGNED CRUSHER for breaking non-abrasive stone and similar materials. Operates at variable speed to produce a wide range of aggregate sizes with *full gradation control. Built in Portable* or *Stationary models* to handle any quarry rock, freely passing the 36" x 48" feed opening.

LOW POSITIONED FEED DEVICE provides minimum feed height for maximum rock penetrations and elimination of "foul balls." Fast, direct shovel loading in portable models; lower truck ramp height provided for stationary units.

CONTRACTORS: Consider the advantage of this improved crusher in terms of time and money saving advantages in highway construction. Prepare your aggregates, mile by mile, eliminate costly trucking —speed-up road building—control aggregate sizes to suit your needs, ON THE JOB!

LET KVS ENGINEERS furnish these "on-the-job" operating facts that show how valuable this new type crusher has proved to be as a portable unit or stationary installation. It's in use on many of America's major highway projects.

DETAILS OF INTERIOR: A single welded unit of steel plate. Incorporates grate adjustment and safety device and also supports the breaker unit mounting on skid frames. Bearing support frames have removable top member for easy access to bearing housings.

Cast manganese steel wear plates line the interior of the reduction chamber, which has a large access door. Reduction chamber, 130 cu. ft. in volume.

THE ONLY MOVING PARTS in Cuber Senior are two identical rotors, each equipped with three rigidly mounted cast manganese steel hammers. Hammers have a single operating face, adjustable outwardly to compensate for wear. Heavy alloy steel shafts pressed and locked onto the rotor core. Self aligning roller bearings. The discharge grate rejects over-size rock back to the hammers. Grate adjustment controls top size of finished material. Safety device protects machine from tramp iron damage.

KENNEDY-VAN SAUN

Manufacturing and Engineering Corporation • Two Park Avenue, New York 16, N. Y. • Factory: Danville, Pa.

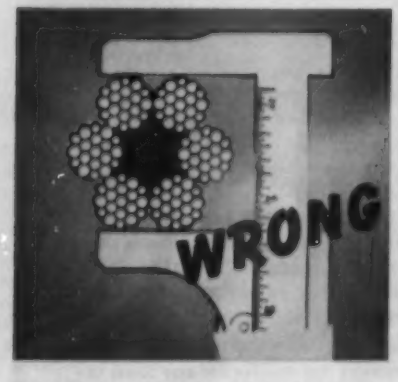
Tuffy tips on choosing the

Measure Groove Diameter Accurately

Shown above is the WRONG way to measure the groove diameter. The result—shorter life of the wire rope you buy. Note that only the sides of the rope will bear on the sheave. In a relatively short time this will squeeze the rope out of round and set up destructive friction and stresses on the rope strands and wires. New rope is oversize and diameter of grooves on sheaves and drums should be slightly larger.

Shown above is the *CORRECT* way to measure the groove diameter. It is a simple thing to do and will give the rope you buy a chance to deliver all the service it possibly can. Remember a wire rope is composed of many closely correlated working parts and sheave grooves which are too large or too small throw them out of alignment. Just like any other working part on a machine, wire rope cannot do its best if it is misfitted.

If Present Rope Is Correct Size, Measure with a Caliper



Measuring the Wrong Diameter is a common mistake that some buyers make when they order replacement rope. When the rope arrives, it turns out to be too small—even though a machinist's caliper was used to assure accuracy. It's an easy mistake to make, but it's just as easy to remember the *right* way and be sure you get the right size rope. Otherwise both the safety factor and service life of the rope will be reduced.

Measuring the Right Diameter is the simple step shown above. Measure so that a single strand is on each of the adjustable edges of the caliper—*not* two strands that measure as a flat side. The actual diameter of a wire rope is the same as that of the circle required to circumscribe it. The diameter of a wire rope is an important factor in determining the safe working load to be handled by your equipment.

Replace Worn Sheaves

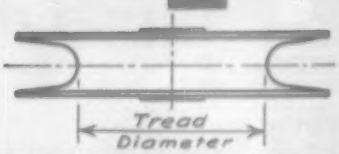
When Replacing Rope, check for sheaves that have been badly worn. Sheaves that have grooves corrugated by the rope lay impression should be replaced immediately before installing new rope. Since rope creeps to a certain extent on sheaves these grooves can actually cut the strands as the rope runs over. This will greatly reduce service life of *any* wire rope.

right replacement Rope

Beware of Critical Tread Diameters

It is highly important to accurately measure the tread diameter of the smallest sheave or drum on any machine. Here's why. It is on this sheave or drum that the wire rope will get the greatest wear. Some constructions of wire rope will work on smaller tread diameters than others without lessening their service life. Engineers have determined the critical tread diameter for different constructions as shown in the table at the right. Also shown in the table is the minimum recommended tread diameter which is 50% larger than the critical tread diameter.

Example, the tread diameter of your smallest sheave is 24 inches. You know that a 1-inch rope is necessary. Referring to the table at the right you see that the 6 x 19 Warrington or Filler wire is suitable because the minimum tread diameter recommended for it is 24 times the diameter of the 1-inch rope. This gives you a margin of 50% over the critical diameter of 16 inches. If flexibility is a factor in the operation then you would choose the Filler wire type of rope with fiber core.



Construction of Rope	Critical Tread Diameter	Minimum Recommended Tread Diameter
6 x 7	28	42
18 x 7	24	36
6 x 19 Seale	20	30
6 x 19 Warrington or Filler Wire	16	24
6 x 31	15	22
8 x 19 Seale	14	21
6 x 37	12	18
8 x 19 Warrington or Filler Wire	12	18

To arrive at critical tread diameter and minimum recommended tread diameter multiply the numbers above by the rope diameter.

Use The "Know How" of *Wire Rope* Specialists

Stemming from many years of cooperation with users and machine builders mastering wire rope problems, is a family of special ropes for special purposes. Into each is incorporated the rope construction, the grade of steel and operating characteristics found to be best for the service for which each is intended.

When you specify one of the Tuffy Wire Ropes, you can say Tuffy and forget complicated specifications!

Tuffy Scraper Rope

It's flexible enough to withstand sharp bends, yet stiff enough to resist looping and kinking when slack. Save wasting sound rope—mount a reel on your scraper.

Tuffy Dragline

Constructed to give you maximum abrasive resistance with extra flexibility. Rides smoothly on grooves, hugs the drum when casting for full load.

Tuffy Dozer Rope

Increases service life . . . reduces down-time. 150' reels mounted on your dozers lets you cut-off worn sections without wasting good rope. 1/2" and 9/16" diameter.

Tuffy Slings and Hoist Line

Tuffy Hoist Line, a longer running rope on all types of hoists. Slings of 9-part machine-braided wire fabric. Kinking or knotting will not materially damage fabric.

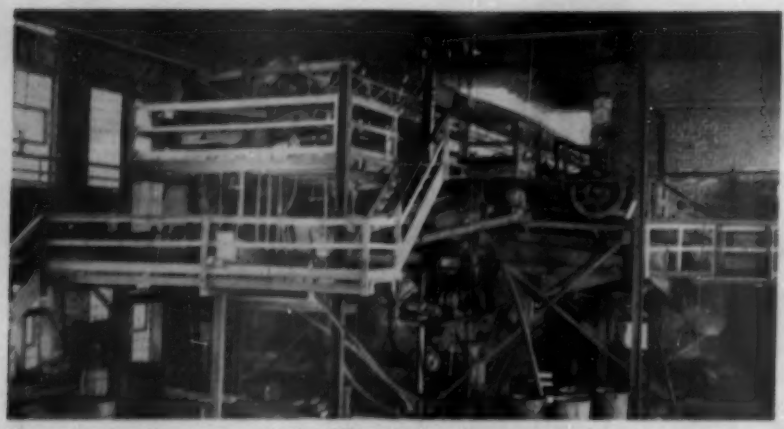
Your Tuffy Distributor Works For You

He's the man who can help you find a fast answer to all your wire rope problems. He's also the man who often knows as much about some requirements of your equipment as the men who made it. He's the man who's eager to supply the kind of service that will hold your patronage. Feel free to call on him anytime.

union Wire Rope corp.

2156 Manchester Avenue Kansas City 26, Missouri

4-C *Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric*



Heavy-media pilot plant installed at White Haven, Penn., which is available for testing sand and gravel and other minerals. The separatory vessel, in the upper left, receives material via an inclined belt conveyor

Heavy Media Pilot Plant Available for Testing

WITH THE INCREASING IMPORTANCE of heavy media separation to the aggregates industry in meeting tightening specifications for deleterious materials, the Ore & Chemical Corporation, New York, N. Y., has installed a pilot heavy media plant at White Haven, Penn. The plant, which has a capacity of 50 t.p.h., is available to the industry for testing samples on a commercial basis and for demonstration purposes. The heart of the plant is the recently-developed OCC separatory vessel, which incorporates an adjustable rake for agitating the feed and removing the deleterious particles. The operation is said to be simple and to have high separating efficiency; there are no moving parts in the medium. This process is adaptable to sand and gravel, crushed stone, coal, other nonmetallic minerals, and metals. A carload of material is required for initial testing purposes.

Bureau of Standards Publication

NATIONAL BUREAU OF STANDARDS has published Miscellaneous Publication 214, "Units of Weight and Measure—Definitions and Tables of Equivalents," by Dr. L. V. Judson. This 64-page book, superseding Miscellaneous Publication 121 issued in 1936, defines the units of length, mass, area, volume, and capacity in use in the United States. It also gives tables of interrelation and tables of equivalents for these units in the metric system.

The volume also contains sections of the fundamental equivalents, the approved spelling and abbreviation of each of the most common units of weight and measure, and the status of the metric system in the United States. All of the tables and other material have been revised to conform to current definitions, equivalents and usages. Order from the Government Printing Office, Washington 25, D. C.: 40¢.

COMPACT PLANT

(Continued from page 69)

Loading in the pit is done with a 2½-cu. yd. Lima shovel with two 35-ton (net load) Western 10-wheeler, rear-dump trucks for haulage. The pit is immediately alongside the plant with the load haul up a slight grade for about 600 ft. A Hough Payloader reclaims ground stored material. Hauling to the George Air Base is done with a fleet of G.M.C. tractor-semitrailers.

Sand and gravel delivered to the George Air Base is processed in a Noble Co. semi-portable, concrete batching plant. This plant can be disassembled into parts not wider than 8 ft. and hence can be hauled on state highways in the West. The Noble plant is owned by Gordon H. Ball, contractor, Danville, Calif.

Shirley H. Aaron, plant foreman

TRIPLE CAPACITY

(Continued from page 82)

The trucks are fitted with Galion bodies. Loading from stockpile is handled by a 1-cu. yd. Osgood shovel, an Allis-Chalmers HD20 tractor-loader, a Hough Payloader, and a Michigan 175 loader. Rail shipments are made via the D. L. & W. R.R. Cars are loaded by a short belt conveyor issuing from ground level truck hopper.

Somerset Crushed Stone Inc. is a closed corporation owned by Mr. Ferrante, who is secretary-treasurer, and his wife, who is president. Mr. Ferrante is one of those rugged individualists who takes an active interest in every phase of the business and is often on the job by 5:00 a.m. Until recent years, Mr. Ferrante was also owner of a contracting firm which he founded in 1931. He is very active in civic affairs, donating the use of his estate (and swimming pool) in Bernardsville for many charitable or civic causes and for employes' picnics. Mr. Ferrante is a proponent of civil defense, and his organization is geared to assist the national effort in an emergency. Company employes have been trained thoroughly in civil defense procedures and will operate whatever quarry equipment is needed during an emergency.

Other officers are James A. Ferrante, vice-president and general manager, and W. T. Welsh, assistant treasurer and office manager. George West is purchasing agent and truck manager, Fred Dolsen, superintendent, Chas. Preen, blacktop plant superintendent, Elmer Hess, Peapack superintendent, Jay Lombardi, paymaster, and Sam Ruggiero, machine shop foreman.

Canadian Cement Shipments

CANADIAN CEMENT SHIPMENTS totaled 22,437,477 bbl. of cement, valued at $59,035,644, during 1954. This compared with 22,238,335 bbl. of cement shipped during 1953, valued at $58,842,022, according to Dominion Bureau of Statistics reports. Exports increased to 123,645 bbl. in 1954, from 14,728 bbl. in 1953, and imports declined to 2,292,200 bbl. in 1954, from 2,482,783 bbl. in 1953. Cement consumption was estimated at 24,606,032 bbl. in 1954, compared with 24,706,390 bbl. in 1953.

Cement Wage Increase

CALAVERAS CEMENT CO. has agreed to an across-the-board 8½¢ per hr. increase for all employes belonging to the United Cement, Lime and Gypsum Workers International Union, Local 57, at the company's San Andreas, Calif., cement plant.

...New

B&W Universal Liner Plates

Raise Performance, Lower Costs

PATENT APPLIED FOR

The new B&W Tube Mill Liners have advantages that mean reduced costs in capital, time and labor.

Cost per ton of material ground is reduced, for the practical reasons listed below. Check them—you may find that one, or a combination, of these qualities will solve your existing problems.

- **Lower Initial Costs—No pattern and chiller costs —the result of standardization.**
- **Longer life of liners—Uniform wear will result from better quality control on a mass production casting, utilizing permanent molds. Size is ideal for uniform chill and heat-treatment.**
- **Longer life for different applications can be realized by a selection of proper materials. This design lends itself to either chilled irons or wear steels.**
- **Direct labor cost and the "down-time" to install the liners are reduced. Castings are easily handled due to small size and weight. Less fatigue of workers. No cranes needed to handle lightweight liner castings.**
- **Cost reduced for storage space. Minimum storage space required as small castings "stack" easily. Records simplified with one design of casting interchangeable for all size mills.**
- **Saves money on liner inventory. One design fits all sizes of mills, permitting standardization. Quicker unloading and storage possible.**
- **Savings in breakage claims and delays for replacements. Hard brittle irons are frequently broken in shipment when large castings are used. Small castings are rugged and almost impossible to break by handling.**
- **Savings in determining most efficient wear pattern. Same castings will produce wear profiles consisting of all lifter ribs, all flats or combination of both, including straight or spiralled lifter ribs. Straight or staggered circumferential joints can be used.**

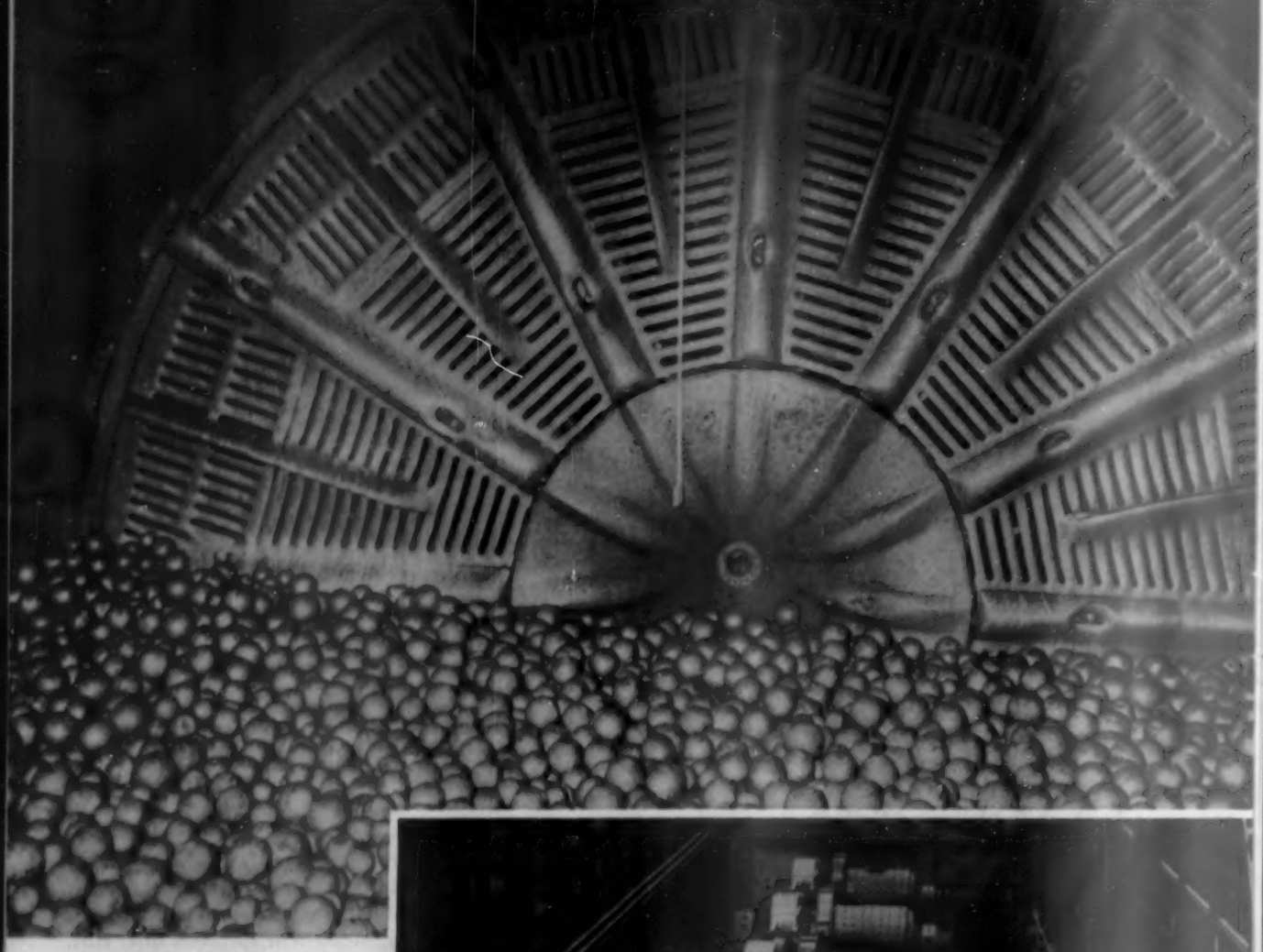
Liners are supplied in two nominal thicknesses, 1½" and 3" with 1½" high lifters. Castings are 6" wide x 12" long. Positive seating of small castings on mill shell means less breakage of castings under operating conditions. For additional information on B&W Universal Tube Mill Liner Plates, write The Babcock & Wilcox Company, Process Equipment Dept., Barberton, Ohio.

BABCOCK & WILCOX

BOILER DIVISION

S-442

AT WHITE PINE



Interior of huge ball mill at White Pine. Lorain Rolled Plate Liners have been heat treated to compensate for severe wear at feed and discharge end.

White Pine Copper Company's ball mill bay. USS Lorain Liner Plate is also used in the re-grinding operation that follows.

See the United States Steel Hour. It's a full-hour TV program presented every other week by United States Steel. Consult your local newspaper for time and station.

Largest diameter ore reduction ball mills built

...use USS LORAIN Rolled Plate Linings

USS Lorain Rolled Plate Linings are snug-fitting because they are made to accurate size. This eliminates shell wash damage.

OFFICIALS OF the new White Pine Copper Company turned their backs on standard procedure and made ore grinding history when they decided on the ball mills for their Copper Concentrating plant at White Pine, Michigan.

After months of calculations, testing, and study of flow sheets, this progressive company went far beyond the accepted maximum size of mills previously used for ore reduction. Looking forward to the last word in efficiency and economy of operation they elected to use mills of the largest practical diameter that could be shipped by rail. The result—an initial battery of six Marcy grate mills 12′ -6″ diameter inside shell, 13′ -0″ active lining length, 90-ton ball load, 1500 H.P. motors—built for White Pine by Mine and Smelter Supply Co. of Denver.

When it came to mill lining specifications, the important considerations were longer life, minimum maintenance and maximum grinding efficiency under the terrific impact and abrasion of 90 tons of ball activity. *USS Lorain Rolled Plate Linings* were specified. No other lining could provide:

1. Rolled steel of special toughness eliminating breakage even when worn paper thin.
2. Parts made to accurate dimensions with close tolerances permitting snug fit, eliminating shell wash.
3. Retention of lift from installation to replacement—resulting in continuous grinding efficiency.
4. No backing required under lining to absorb shock.
5. Longer life translated into lower cost per ton of ore ground.
6. Consistent performance of renewal linings.

The performance of USS Rolled Plate Linings has been highly satisfactory to the operations personnel at White Pine. Any operator, regardless of mill diameter, length, material ground, or special conditions, can get the same degree of satisfaction by specifying *USS Lorain Rolled Plate Linings*. The linings can be purchased through leading mill manufacturers. For additional information write to Room 4930, United States Steel, Pittsburgh, or consult the nearest U. S. Steel District Office.

USS Grinding Balls can help you get better performance from your grinding mills. They are made of special composition steel to make them wear long and evenly. Samples from each production are thoroughly tested to assure high surface hardness and maximum hardness penetration. They come in eleven sizes from ¾″ to 5″.

UNITED STATES STEEL CORPORATION, PITTSBURGH • COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS LORAIN ROLLED PLATE LININGS *and* USS GRINDING BALLS

USS

9-1464

UNITED STATES STEEL

How to Get the Most Out of

VIBRATING SCREENS

By J. R. BRANDON*

IN CONSIDERING MAINTENANCE of mechanically vibrated screens, they usually fall into one of the following classes or types:

1. Two-bearing type. These are normally actuated by a concentric drive shaft with the motion, or stroke, imparted by an off-center weight on each side. Variations in stroke may be made, within the limits of bearing capacity, by varying the amount of counterweight used.

2. Four-bearing type, employing an eccentric, counterbalanced drive shaft. The stroke of these machines is pre-determined by the amount of drive shaft eccentricity and cannot be changed except by the substitution of the proper shaft for the stroke desired. In this application, the counterweights on each end of the shaft are used as balancers to provide smooth operation. Due to this balancing requirement, no additions to the vibrated weight, such as chutes, hoppers or discharge lips, should be made without consulting the manufacturer of the screen.

3. Horizontal screens, actuated by off-center shafts or weights joined together by sprockets and chains or gears. These are also of the four-bearing type but are related to the two-bearing screens in that the stroke is not of the positive, crankshaft-throw type. Such screens are usually employed where headroom is at a premium, or where an unusually sharp sizing or dewatering of product is desired.

When installing an inclined screen, be sure that the beams upon which it is mounted (or from which it is suspended) are level and in line. Provide sufficient rigidity to support the weight of the screen and its load and also to absorb the vibrational residue from the live frame. Many present-day screens are mounted on soft coil springs for this latter purpose. These springs either support the live frame directly or are installed between the base frame and the solid structure. Some manufacturers also use rubber torsion blocks or other devices to effect the connection between moving and stationary parts.

Be sure to provide space around the screen so that it may be inspected easily, and maintenance operations will be facilitated. Additional room must be provided at the feed or discharge end for removing and replacing screen cloth panels. For ease of handling and economy of space, it is preferable to have a screen which uses several short panels per deck, rather than one long panel. Cloth may then be interchanged to distribute the wear more equally.

The purpose of inclining any screen is to permit gravity to aid in removing the oversized particles from the screen surface. The flatter the screening angle that can be maintained for any given feed the more accurate sizing will be obtained. This is due to the fact that the material will remain on the screen longer and also because the effective screen cloth opening at any given angle is reduced as the angle is increased, since the effective opening is the vertical projection of the actual opening.

A dense, compact material will pass over a screen faster than a light, more porous one. Also, a lighter material must be allowed to remain longer on the screen as it will not pass through the openings as quickly.

In many cases, the material can be made to remain on the screen longer through use of a fairly steep angle with the vibrator run in a counterflow direction.

The same general rules for installation of inclined screens also apply to flat screens and dewaterizers. Here, however, if angle changes should be necessary, they are normally slight and are accomplished by blocking or raising the feed or discharge end to give a maximum angle of 3 deg. or less.

Chutes and Hoppers

In constructing a hopper beneath the screen, make sure that the valley angles are steep enough so that the material flows freely and will not back up to contact the screen live frame, leading to eventual breakage of the structural parts of the screen.

Design feed chutes so as to get the best possible distribution of material across the full width of the screen. Try to design the chute so that material will fall upon the screen as gently as possible, in the direction of flow. Also, employ the maximum length of the screen by feeding close to the head end. A properly-designed feed chute will pay for itself many times by reducing screen cloth wear and obtaining maximum efficiency.

As in discharge chutes, make sure that the feed chute is clear of the screen live frame in all positions. Allow sufficient clearance so that live frame angle may be varied 5 deg. either way from the original angle—also bearing in mind that it may be desirable to provide for the screen to be swung to a horizontal position for changing cloth. This is especially important if sizing requirements necessitate frequent cloth changes to obtain sufficient openings.

Maintenance

Maintenance of a properly-installed screen should not be difficult, since enough room and facilities will have been provided for most maintenance operations.

It is difficult to establish a blanket daily, weekly or monthly routine, since this will vary according to the use in which the screen is employed. Adverse conditions such as heat, dust, or moisture require more frequent lubrications and checkups, while screens handling very abrasive material or used with corrosive water wear out cloth and live frame components in less time.

All welds should be inspected occasionally and all bolts checked for tightness. If the screen develops unusual noises which don't appear to come from the bearings, shut down and investigate as soon as practical. Many a screen has been damaged more extensively than necessary by running with loose parts.

Bearings and Lubrication

Although today's vibrating screens are ruggedly constructed and will stand up under years of hard usage, the heart of these machines is the vibrator itself, which is a precision mechanism. Shafts and housings are manufactured to close tolerances, while the roller bearings are finely ground and assembled in dust-free rooms by skilled operators.

While vibrators are protected externally by heavy enclosures, the bearings must be cared for and lubricated

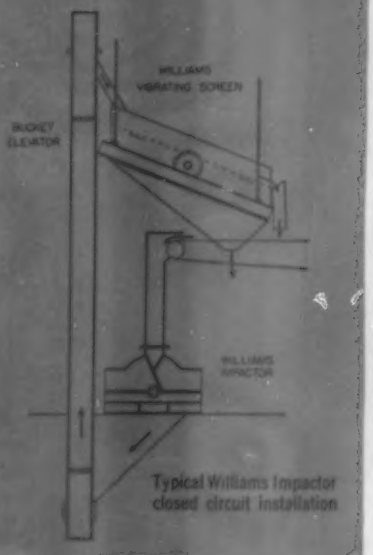
(Continued on page 94)

*Materials Handling Engineer, Hewitt-Robins, Inc.

Lowest-Cost Crushing

with better product control

Open view showing hammers and impact blocks. Extremely rugged, heavy construction of steel plate with manganese steel liners, hammers and impact blocks. Extra large shafts are mounted in oversize bearings sealed in self-aligning housings.



Typical Williams Impactor closed circuit installation

WILLIAMS *Reversible* IMPACTOR

By properly controlling the forces of speed and mass in size reduction operations, Williams Impactors offer the lowest possible cost-per-ton in producing top quality materials from 2" down to 35 mesh with a minimum of fines . . . or much smaller where more friable products are handled. In closed circuit systems with external vibrating screens, a single Impactor promises 100% product sizing with surprising economy, even with the most difficult specifications.

No grates are required, hence no replacement expense of these parts is necessary. Quick, uniform reduction, sizing and discharge from the mill eliminates any grinding attrition action that causes excessive wear, especially if raw materials are highly abrasive. Reversible rotation eliminates manual turning of hammers and minimizes down time. Impact blocks are also reversible which further reduces cost. Parts last up to 7 times longer than in other types of equipment. Unusually low maintenance is a feature of the Impactor.

You have much to gain in lower costs and better product quality control with an Impactor. *Write for literature.*

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
800 St. Louis Ave. St. Louis 6, Mo.

WILLIAMS

CRUSHERS GRINDERS SHREDDERS

Hammer Mills Helix-Seal Mills Roller Mills Air Separators Vibrating Screens Feeders

OLDEST AND LARGEST MANUFACTURER OF HAMMER MILLS IN THE WORLD

TAILORED POWER

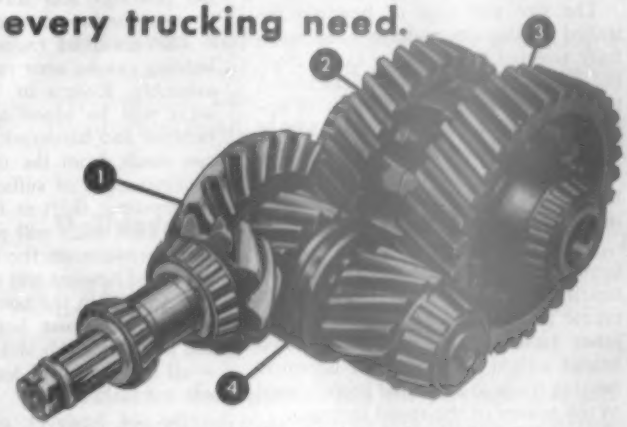
FLEXIBLE POWER is the key to profitable hauling today. A vehicle must have the *workhorse pulling power* to haul heavy loads! *Torque* is needed for bad road conditions or hill-climbing! *Speed* is needed for fast hauling, to bring an empty vehicle back for new loads sooner.

TDA 2-Speed Axles answer trucking's need for flexible power. Exclusive double-reduction design permits a range of spreads all the way from 28% to 49% . . . in an almost unlimited number of gear combinations. TDA allows tailoring the power of your truck to meet any variety of hauling conditions.

COMES TO TRUCKING

with TDA 2-speed axles

Exclusive, double-reduction design offers almost unlimited possibilities of gear ratios and ratio spreads—this versatility provides tailored power for every trucking need.



How TDA's extra "spread" works to your benefit. *All* 2-speed axles employ an extra set of gears to give two ranges of speed or power to choose from . . . one for *pulling power*, the other for fast speed. Most 2-speed axles offer only one choice of "spread"—37%. Design limitations prevent changing this standard "spread".

However, TDA uses the exclusive double-reduction design. With TDA, spreads are available all the way from 28% to 49%. This means that your axle can actually be tailored to give you just the power you need. Not only can you specify the spread most suited to your immediate trucking need—but you can easily *change* from one spread to another by merely changing the low speed helical pinion and gear—*an easy mechanical change.*

TDA's more efficient use of engine power gives important benefits . . . high road speeds, faster deliveries, better payload, and maximum fuel economy. No matter what your hauling problem or load/road conditions you save with TDA.

How TDA's 2-Speed principle works! A husky hypoid ring gear and pinion set (No. 1 above) provide the *first step* of the total gear reduction for both fast and slow ratios. Two large, heavy-duty helical gear sets provide the *second step*. Both sets are of balanced size and capacity. One set (No. 2) is for fast speed; the other (No. 3) is for slow speed. The clutch collar (No. 4) power shifts to right or left to engage one helical pinion or the other.

Greater endurance, longer truck life with TDA. TDA's simple design eliminates small complicated parts and midget size gears. Large hypoid-helical design provides more teeth in contact—quieter operation and far less strain. Bearings are larger, too. All this adds up to more profitable operation under all conditions.

TIMKEN Detroit AXLES

ROCKWELL SPRING AND AXLE COMPANY

The Accepted Standard — TDA — TRADE MARK REGISTERED

World's Largest Manufacturers of Axles for Trucks, Buses and Trailers

Plants at: Detroit, Michigan • Oshkosh, Wisconsin • Utica, New York • Ashtabula, Kenton and Newark, Ohio New Castle, Pennsylvania

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Increase axle life with GENUINE TDA EQUIPMENT PARTS

Take no chances with ordinary replacement parts. For sure, dependable, factory-type jobs, specify genuine Timken-Detroit Axle parts kits—identical to your axles' original equipment.

Each kit is complete—gives you everything you need in one handy package. Gaskets and shims, brake liners and rivets, steering knuckles, king pins and bushings, differential nests—for every size of brake and axle. Order by number from your dealer. Cut labor and adjustment costs. Get trucks back on the road quicker.

VIBRATING SCREENS

(Continued from page 90)

with respect for their construction and the job which they perform. Lubrication recommendations may vary slightly from one manufacturer of vibrating equipment to another. However, you may be sure that each has spent considerable time with the various bearing companies and petroleum representatives working out the best possible type of lubricant and schedule of lubrication for your machine. Many maintenance people are not familiar with the exacting requirements of the modern precision anti-friction bearings and have a tendency to treat them with a hit-or-miss attitude. This is false economy. Follow the recommendations of the manufacturer and greater life will be realized from the equipment, not to mention considerable savings in unnecessary down-time.

The size and type of bearings installed in the screen have been carefully selected to provide a satisfactory life figure, which is usually calculated to give a minimum of 2500 hr. of operation. The average bearing life is four or five times the minimum figure —while many screens have run for as long as 15 to 20 years without a bearing replacement.

Correct shaft speed is a very important factor in obtaining satisfactory bearing performance, since a speed increase in itself, without changing any other factors—such as stroke or vibrated weight—will increase eccentric bearing loads to an extent proportional to the *square* of the speed increase.

Conversely, a decrease in speed of only 100 r.p.m. often may double the life of eccentric bearings. However, in many cases it is not practical to reduce speed due to the possibility of an accompanying drop in screening efficiency.

Some screen operators are tempted, if experiencing premature bearing failures, to decrease the originally-specified speed of the screen to take advantage of the resultant increase in bearing life. Although, admittedly, this probably will space the failure farther apart, it won't cure the cause of the trouble. It is usually preferable to find out why the failures are occurring and then correct the discrepancy. If this is done, more satisfactory operation will be the result .

Causes of Bearing Failures

One of the most common causes of bearing failure is dirt, dust, or other foreign material. Failures from this cause can be recognized in several ways. Generally, fine dirt in a bearing acts as an abrasive and causes lapping of rollers and raceways. This can be seen and felt in the roller or ball paths of the bearing. These paths will be polished, as will the rollers or balls. On spherical roller bearings, many times a circular ridge will be found on the rear, or inside, of the rollers from abrasive contact with the center land of the inner race. If there are no breaks in the surfaces of the rolling elements and the path is clearly defined on the raceways, you can be sure that dirt was in the bearing. When such a bearing is allowed to continue in service, of course, spalling eventually will occur and complete failure will result.

Remedy for this type of failure is to find where the foreign material entered the bearing and eliminate the condition. Sometimes dirt will enter through worn seals. They should be replaced and the frequency of lubrication should be stepped up to purge the bearings and lubricate the seal contact surfaces at shorter intervals.

The result of excessive heat in a bearing can be seen readily upon disassembly. Rollers or balls and raceways will be blued and grease carbonized and hardened. Excessive heat can result from the use of incorrect bearings, lack of sufficient lubrication or improper shaft or housing fits. An undersized shaft will permit the inner ring to rotate on the shaft, while an oversized housing will permit the outer ring to spin in the housing. Both conditions will cause heat, smearing of the parts that rub and rubbing cracks —all of which will lead to early failure.

Do not, however, confuse the normal slip fit of bearing races—which is sometimes used on anti-friction bearings to provide for shaft expansion—with an undersized or oversized condition. Again, check the manufacturer's specifications.

A somewhat unusual cause of early bearing failure is pitting and flaking due to electric arcing. This condition, which actually burns small craters in the rollers or balls, is usually caused by electric welding done as a repair measure on the screen in such a manner that the ground for the welder is attached at some point which causes the current to pass through the bearings of the screen.

When replacing bearings, the new bearings should be handled with extreme care to insure that they are kept absolutely clean while exposed. Leave the wrappings on until the last minute and wherever possible do the work in a clean shop rather than at the screen location. Use care in assembling; don't hammer on the races and be sure that the races are not cocked during installation. Check and clean all seals and do not forget the mating surfaces against which they ride during operation. If these surfaces are worn, scored or grooved, replacement of seals is useless since improper sealing will result.

Screen Cloth

Screen cloth is made in many types and wire hardnesses. Oil-tempered wire will provide the maximum resistance to abrasion, but in some cases where large lumps are being screened a milder steel wire is preferable, since it can absorb more flexing without breaking.

Most screens employ either a flat, bolted deck or an arched span of bars over which the cloth is tensioned—usually from the sides. Either type requires firm support; an arched deck should be checked frequently to insure that the cloth is tight and bearing on all bars. Worn rubber or metal support caps should be replaced immediately, since any looseness will allow the cloth to whip and break prematurely. Inadequate tensioning is always a prime suspect in cases of too-soon cloth failure. As mentioned previously, material should be fed onto the deck as gently as possible, well back toward the feed end so as to utilize all of the available screening area. If cloth wears excessively at the feed point the material-drop onto the deck may sometimes be softened by use of a piece of rubber belting or other device on top of the cloth at the area affected. Where practicable, frequent interchanging of panels at feed and discharge ends will help to distribute the wear.

If blinding of moist or sticky material is experienced, non-blind cloth with slotted openings may be used or a heated cloth installation may prove to be the answer. Most screen manufacturers will be glad to help solve such problems where they exist.

In conclusion, it is realized that only the surface of many topics has been scratched which could consume volumes. However, it is hoped that this article may have been helpful in providing some of the answers to maintenance problems which have been encountered or in forestalling others which might arise in the future.

Adds Quicklime to Agstone

AN AGRICULTURAL LIMESTONE PRODUCER in Wisconsin adds approximately 10 percent of pulverized dolomitic quicklime to the pulverized dolomitic agstone, according to a report in "Limeographs." The quicklime is said to aid in drying out the porous dolomite, and also to improve the efficiency of the liming material by providing a fast reacting source of lime and increasing the total neutralizing power.

YOU can earn more with this rear-dump hauler . . .

Hauls anywhere — With big rubber tires, Tournapull Rear-Dump safely travels mountain trails, cross country, city streets . . . hauls over roughest terrain, through mud, snow, soft fills.

Resists body shock, damage — Three-layer, all-steel, grid-type bowl with tool-steel floor resists shocks of dumped-in rock. Big, wide bowl opening proves easy target for any loading unit.

Reduces maintenance — Because Tournapull has no hydraulics, no jack lines, no long driveshaft, no frame, springs or tie rods, it eliminates common troubles of other rear-dumps.

Improves safety — Multi-disc air brakes have more braking surface on one wheel than most haulers have on 4. Low center of gravity, good visibility, front-wheel drive, easy control also boost safety.

Dumps fast, clean — A touch of a switch activates hoist motor. Body lifts quickly, swings behind rear wheels to dump clean over bank. Streamlined bowl sheds material readily.

Delivers full power—Torque converter (optional) automatically balances load and torque so you get full hp always. Lugging is reduced; shocks between engine and final drive virtually eliminated.

Cuts weather delays — Power-proportioning differential automatically applies extra power to drive wheel on firmest footing . . . pulls unit through soft spots which stop ordinary haulers.

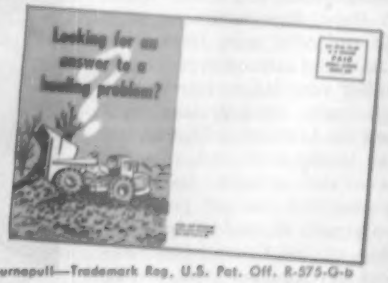
Reduces fatigue — Big low-pressure tires and air-foam cushion seat smooth out bumps . . . eliminate "up-and-down ride". Push-buttons control every action. Fatigue factors are greatly reduced.

Works fast in tight quarters — 90° turns within a radius of half of unit's length, plus power steer, quickly position "big-target" body under dipper. No switching back and forth, no turntables.

Insures future earnings—Behind Tournapull prime-mover, you can interchange scraper, bottom-dump, other trailing units. With them, you fit any type of future operation, earn more annually.

Eliminates manual work — Fingertip electric controls on instrument panel activate electric motors at point of action. Heavy manual work fighting steering wheel and control levers is eliminated.

Each of the above points is proved in this booklet . . . Ask for your copy!



Tournapull—Trademark Reg. U.S. Pat. Off. R-575-G-b

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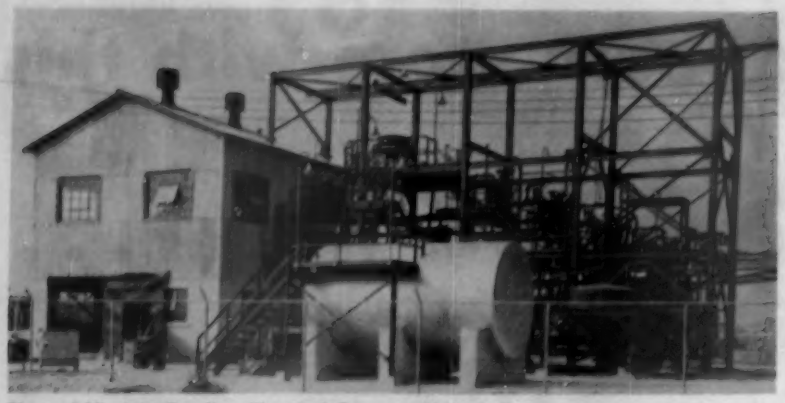

Plant of Virginia-Carolina Chemical Corp., at Nichols, Fla., recovers uranium concentrate during fertilizer manufacture

• Phosphate producers have made a substantial contribution to the Atomic Energy Commission's program in recovering Uranium by constructing by-product plants

By JAMES A. BARR, JR., JOHN W. RUCH, AND RALPH F. BORLIK*

Recovering URANIUM As By-Product in Phosphate Processing

PRINCIPAL SOURCES OF URANIUM, for the present, are outside of the United States, and we are dependent on foreign shipments for a major portion of our supply. Canada, the Belgian Congo and the Union of South Africa are these sources. Australia is a promising new potential source and many others are being investigated. Currently, our most important domestic production comes from the Colorado Plateau area where there are a number of mills which concentrate and extract uranium from carnotite-rosoelite type, vanadium-uranium ores and other types as sufficient reserves are developed.

The U. S. Atomic Energy Commission is interested in the concentration of uranium which occurs in certain types of marine sediments, particularly the phosphorites and black shale. Although these formations are very low grade and offer most formidable concentration and extraction problems, they do offer very large reserves and have been under consideration since 1946 when the Manhattan District began active exploration and research programs on such domestic resources.

Exploration and research programs have been greatly expanded under the sponsorship of the Commission. Research and development studies were included in the programs and were carried out in cooperation with the entire phosphate industry, many universities, research institutions and Commission research facilities.

The U. S. Geological Survey co-operating with the Commission has maintained comprehensive exploration programs for low grade sources which offer promise of large uranium reserves.

Highest concentration of uranium in phosphates occurs in the deposits of the Pliocene Bone Valley formation in Florida and the Permian phosphoria formation of Wyoming, Montana, Idaho, Utah and Colorado in the Western phosphate area. Although uranium concentration amounts to only an approximate range of two-tenths to four-tenths of a pound per ton of rock, the Atomic Energy Commission has very actively sponsored research and process development in cooperation with phosphate and fertilizer industries with the objective of producing uranium concentrates as a by-product of phosphatic fertilizers and phosphate chemicals.

Development of feasible process technology to include all available low grade possibilities will continue to cause furrowed brows for some time to come. However, the objectives are most worthy of consideration and potentialities most attractive for commercial exploitation since, in addition to

At the new plant of Texas City Chemicals, Inc., Texas City, Texas, uranium is being recovered as a by-product concentrate from Florida phosphate rock in the manufacture of feed grade dicalcium phosphate and also fertilizer grade

*Abstracted from remarks prepared by James A. Barr, Jr., assistant director, Division of Raw Materials; John W. Ruch, chemical engineer, and Ralph F. Borlik, production engineer, U. S. Atomic Energy Commission, and presented before the annual meeting of the American Chemical Society in Chicago and brought up to date.

Tournatractor quickly cleans mine floor. Operator makes effective use of rig's instant-shift, constant-mesh transmission to doze and back away in a hurry. Big tires provide plenty of flotation and traction, have good durability despite the abrasive, rocky footing. Unit works 24 hours a day, 7 days a week, helps on both stripping and ore removal.

Iron mine in New York

puts 19 mph speed on cleanup work

- **Rubber-tired tractor clears pit-floor after blasting**
- **Rig also cleans up around 4½-yd. shovel**
- **In winter, plows snow from haul roads and blast areas**

Open pit operators and contractors have a common problem in handling their cleanup work. In either case it's a need for getting the most in speed and maneuverability. Here's a typical example of how Tournatractor licked this problem for an eastern iron mine.

On the relatively long runs between operating faces, this 19 mph rig makes a much faster trip than could a crawler-tractor. Another advantage of Tournatractor is that it does not cut-up the surface of the haul roads like a crawler does.

During winter, Tournatractor also finds time to plow snow from the pit roads and loading areas. It also clears areas to be blasted. This keeps snow from getting mixed in with the shot rock and later from causing trouble inside the crushers.

"Excellent on night shift"

For work on the night shift, owners are particularly pleased with the lights on their Tournatractor. They find that "night work does not slow this rig nor put any limitations on areas where it can travel or work."

For proof of the advantages, of this high-speed 208 hp machine, ask for a demonstration *on your job*. See for yourself how quickly and economically it handles your scattered assignments for pushing, pulling and dozing.

The ore body being mined here was discovered in 1810 by engineers surveying a military road between Albany and Ogdensburg. Only a small amount of iron was removed, however, until 1944 when modern methods of beneficiating magnetite and low-grade non-magnetic martite ores made the operation profitable. This year, 1,300,000 gross tons will be processed. All will be taken from a deposit slightly over 2 miles long and 200' to 1400' wide. Iron content averages 24%. Overburden includes a structural hanging wall of granetized gneiss, plus up to 60' of glacial drift (mostly sand, hardpan, and boulders). Height of operating faces is set at 50' except for some first cuts of 100'. Drilling is made with 42-T and 50-T churn drills, with chrome-nickel-moly bits of 4340 grade. Nine-inch primary holes are spaced about 23' apart and burden at toe is kept as close to 20' as possible. Every pound of explosive breaks about 2.35 gross tons of crude ore. This is loaded by 4½-yd. shovels into 22-ton rear-dumps and transported to the 54 inch primary crusher. Rock chunks too big to pass the 4½-yd. dipper (about 1 chunk per 40 tons of crude ore) are reduced to handling size by a 4-ton drop ball handled by a truck crane.

Tournatractor—Trademark T-751-M-b

LeTourneau-Westinghouse Company

PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

new phosphatic fertilizers there are co-product and by-product possibilities which include alumina, fluorine, uranium and other minor metal and non-metal values.

Recovery of By-Product Uranium

Process studies include the recovery of by-product uranium from industrial sources such as:

A. Wet process phosphoric acid.

B. Phosphate chemicals from wet phosphoric acid.

C. Triple superphosphate fertilizers.

D. Nitric phosphate fertilizers.

E. Normal superphosphate fertilizers.

F. Electric furnace operations for elemental phosphorus.

Process methods resulting from some of these studies have already been accepted by the phosphate industry as indicated by current by-product uranium production. A program for process studies included the operation of two very small pilot plants to prove the process feasibility of producing high analysis fertilizer products from the "aluminum phosphate zone" material. Engineering feasibility studies were included in the program to determine capital and operating costs based on sound engineering principles. Plant food value of these newer products is being determined by a widespread program for agronomic tests under actual farming conditions in addition to the regular greenhouse tests. The processes are quite flexible to utilize a variable raw material and to produce several end products. The significant difference in end products will be in the nitrogen-phosphorous ratio, 11-62-0 to 20-20-0, a range which offers exceptional possibilities for high analysis complete fertilizers and the shipment of concentrated fertilizers to new market areas to the benefit of the phosphate industry and the American farmer.

The Commission's program to develop economic production of domestic uranium from low-grade sources anticipates full cooperation of the phosphate industry. By sponsoring long-range basic research and process development projects, the Commission offers the phosphate industry a new opportunity for the conservation of an essential natural resource and realization of new by-product and co-product values through better technology.

Results from industry cooperation and participation in the phosphate program have been most encouraging. The goal is worthwhile, for who stands to benefit more or should know more about phosphate fertilizers and phosphate chemicals than the industries involved in their production.

Nature of Phosphate Deposits

Several counties in Central Florida encompass a Florida phosphate pebble producing district and account for a major portion of the total production of phosphatic materials used in the United States.

Phosphate pebble concentrate is produced in this district from an underlying phosphatic Bone Valley formation of Pliocene origin, which consists of two distinct phosphatic strata; matrix and leach zone, respectively. It is from the stratum locally called matrix that the phosphate rock of commerce is produced. Immediately overlying the matrix is an aluminum-phosphate stratum which also contains small quantities of uranium and is

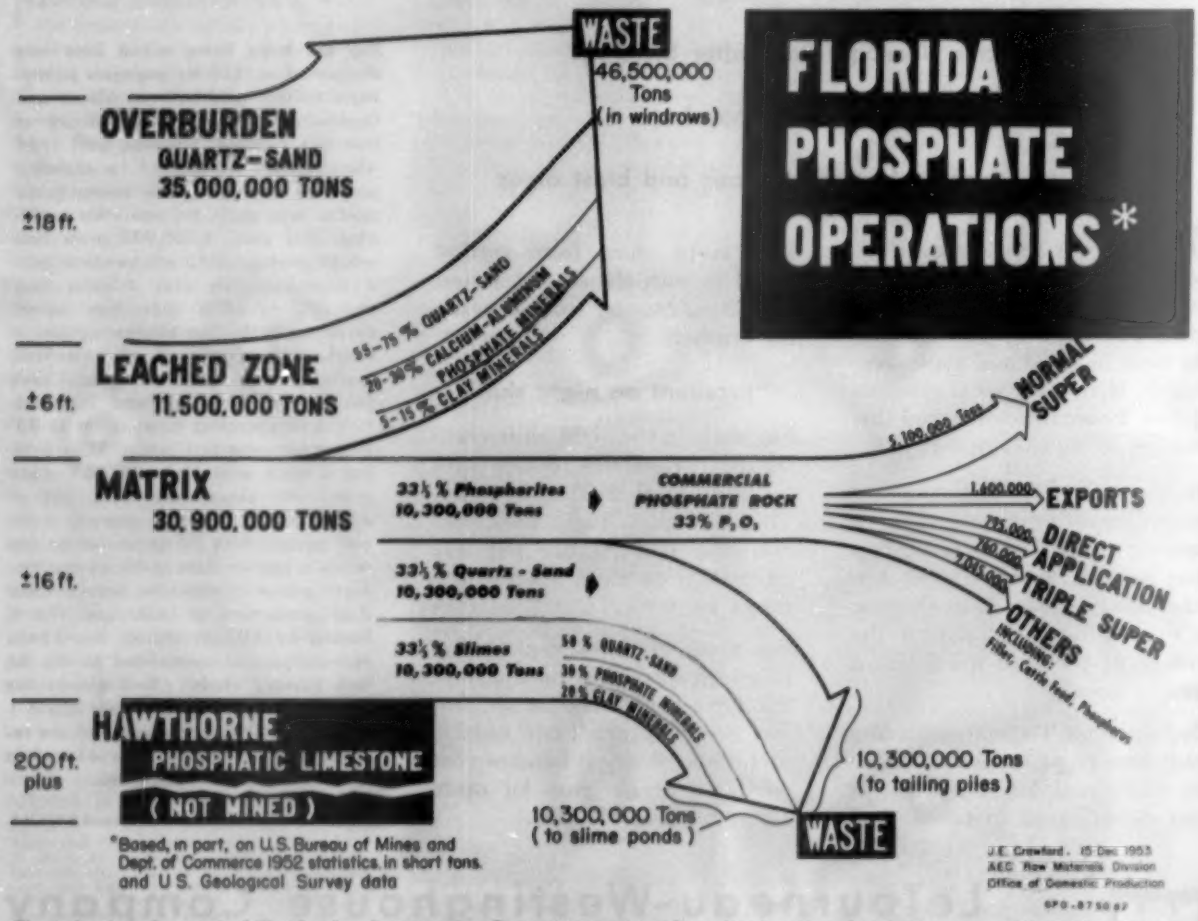

Chart showing character of Florida phosphate sources. Formation consists of overburden, two phosphatic sources (leached and matrix), and a phosphatic limestone, below, which is not mined

Nice breakage for gneiss!

MISSION: Move a tough 20' gneiss burden off a 69' quarry face. Get good breakage, good displacement—but hold noise and vibration to a minimum.

METHOD: Initiate blast with ROCKMASTER® millisecond delay electric blasting caps and a combination of Giant gelatin and Apex® explosives.

Alternate pattern blast. Note excellent confinement. Toe moves out first. No wasted explosive power.

Burden moves away from face. Excellent control of throw. Minimum air blast . . . little vibration . . . no wild flying rock.

Note nice breakage and displacement. A good workable muck pile for gneiss—tough as it is to blast.

NICE BREAKAGE for gneiss—tough as it is to blast. Muck pile perfectly spotted . . . well spread out for easy digging. Pompton Crushed Stone, Inc., does it again, as this efficient quarry at Riverdale, N. J., chalks up "another successful ROCKMASTER® blast."

An 18-hole well drill blast. 14 holes loaded in 3 decks . . . 4 holes with 4 decks each. Alternate blast initiated at bottom of holes using ROCKMASTER 25- and 50-millisecond delays. There's no wasted explosive power. Explosive force is confined—it goes to work on the rock. Noise and wild throw are virtually eliminated.

Ask your Atlas representative about ROCKMASTER—the blasting method that gives you quiet efficiency, saves explosives, and adds a "good neighbor policy" for a bonus.

BLAST DATA:

Height of face	69'
Burden	20'
Number of holes	18
Diameter of holes	9"
Depth of holes	69'
Spacing	20'
ROCKMASTER delays (alternate pattern)	2 & 3
Stemming	21'
Powder factor	3.52
Total tons stone	46,980
Total explosives	13,340 lbs.
Loading started	8:15 A.M.
Loading finished	12:30 P.M.
Blast fired	3:02 P.M.

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Uranium extraction plant of International Minerals & Chemical Corp., Bonnie, Fla.

referred to as "leached zone," currently considered as waste and removed with the surface quartz sands as overburden. The strata overburden sands, leached zone and matrix vary widely in thickness from nothing to 25 ft. or more with a range of 5 to 15 ft. being near the average thickness for each of the phosphatic members. The Bone Valley formation rests on a non-conforming bed rock formation known as the Hawthorne limestone, which presently has no commercial value.

Both matrix and leached zone material contain uranium in a range of 1/10 lb. to 4/10 lb. U_3O_8 per ton and while by-product uranium concentrate is produced from the localized major mining area, it is well known that phosphatic material exists in other nearby areas extending toward the South, North and East into Georgia and the Carolinas along the ancient coastal coral formations and low-lying beaches.

Phosphate Processing and Commercial Products

In Florida, overburden consisting of barren sand and leached zone are stripped by huge walking draglines and piled in previously mined-out areas. After the stripping operation, matrix is mined by a dragline and dumped into a small pit where it is slurried by high pressure hydraulic monitors with water. The slurry is then pumped by a single huge pump for short distances or in stages for long distances to the washing plants up to 5 miles away. More than 25,000,000 tons of matrix were mined last year, from which about 9,000,000 tons of commercial phosphate rock were produced. An estimated 14,000,000 tons of leached zone material were moved during mining operation for the matrix.

The washing plants are separation units in which matrix slurry is further broken down by log washers or mud hogs and graded by wire screen or hydraulic sizers according to particle size. Washing operations consist of scrubbing, screening, hydroclassification to reject minus 200 mesh slimes as waste and are followed by concentrators to treat the minus 14 plus 200 mesh fines on agglomerate tables and in spiral concentrators followed by froth flotation processes to produce high-grade phosphate pebble concentrates. About one-third of the mined matrix is recovered as saleable phosphate rock, one-third is discarded as silica, and the remaining third is waste phosphatic and clay minerals. Western phosphates are mined either by strip or underground mining operations and are generally fed directly to the processing plants, as mined or after a desliming operation. The scale of operations in the West is currently much smaller than in Florida, but is rapidly increasing due to the advent of new fertilizer and elemental phosphorus operations to supply an increasing demand for phosphatic fertilizer and chemical products.

Four Major Channels

Commercial phosphate rock is processed through four major channels: (1) normal superphosphate fertilizer, (2) wet process phosphoric acid for the production of triple superphosphate fertilizer, (3) electric furnace for production of elemental phosphorous, and (4) phosphate chemicals.

Problems of By-Product Uranium Recovery

1. Wet Process Phosphoric Acid

Production of uranium from wet-process phosphoric acid is in every sense a by-product operation. The Commission's program in this field contemplates installation of an additional step in existing plants to recover uranium in concentrate form, without disturbing existing plant practices and without loss or change of phosphatic products. This program has proceeded through the laboratory and pilot plant stages. One company is currently operating a full scale uranium recovery plant and still other companies are breaking in or constructing additional by-product facilities.

Technical problems encountered in this field fall into two major categories which, in order of importance, are: (1) the mechanics of recovering a value which is present in very small concentration, and (2) maintaining high yields, both from the solid phase to solution and in the solution recovery phase. Applicable processes fall in a pattern often used for the recovery of an element from dilute solutions, and studies include solvent extraction, ion exchange, precipitation, adsorption, and co-precipitation.

As might be expected, the low concentrations of uranium in commercial phosphoric acid are present in a very complex chemical system, which is not yet well understood. However, work is proceeding rapidly on this problem, and we anticipate that the complete answer will result in process know-how to provide higher yields and improved technology for uranium extraction.

2. Recovery of Uranium from Superphosphate

As previously noted, a major portion of the total uranium occurring in phosphate rock eventually reports in normal superphosphate fertilizer. Superphosphate manufacture is carried on in a large number of plants, in excess of 200, most of which are relatively small. This pattern immediately places stringent restrictions upon the flexibility allowed the development chemists and engineers in devising a by-product uranium recovery process for normal superphosphate. Economically it means that both capital and operating costs for a by-product recovery unit must be low. In addition to this difficulty, plant practice in the manufacture of normal superphosphate imposes other major technical problems. These stem from the nature of manufacturing techniques, consisting of the wetting of ground rock with sulphuric acid, allowing a curing period of a few weeks, and grinding the solidified mass to give the desired product. This procedure offers no liquid phases and permits only two process approaches. One of these constitutes a solid phase reaction, resulting in the segregation of uranium followed by a solid-solid separation. The second approach consists of leaching the uranium from the product without changing the physical, chemical, handling, or storage properties of the fertilizer. In summary, the possibility of recovering uranium from normal superphosphate presents several severe difficul-

New Model Bucyrus-Erie Walking Dragline GOES TO WORK IN FLORIDA PHOSPHATE FIELDS

770-B
Electrically Driven with Ward Leonard Control

The first Bucyrus-Erie 770-B Walking Dragline was shipped recently to the phosphate fields near Bartow, Fla. It's the first installation of this particular model, but it's not a first for the stand-out features which forecast success for this newest member of the Bucyrus-Erie line. The 770-B will be at home on its multi-million yard assignment because of high output features such as these:

The dragline's all-welded boom, composed of T-section chord members with tubular bracing, combines maximum strength for carrying heavy payloads with minimum deadweight that keeps swing inertia and roller loads low. Excellent maneuvering ability is provided by the exclusive Bucyrus-Erie walking mechanism. Swing is accelerated and decelerated rapidly under Ward Leonard rotating control . . . digging and hoisting are fast, too, because both the drag and hoist drum units have their own individual motor drive.

These are only a few examples of the many 770-B features that mean outstanding performance in all stripping or other long range excavating operations requiring bucket sizes of 18 and 14 cu. yds. with corresponding boom lengths of 195 and 225 feet.

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Uranium concentrate is recovered as a by-product of sodium phosphate chemical manufacture at the Joliet plant of Blockson Chemical Co. Florida phosphate rock is the source of raw material

ties, but even so, technical progress is being made, and recovery of uranium from this major potential source will probably be reduced to a problem of economics.

3. Washer Slimes

About nine million tons of slimes are produced in the phosphate rock washer plants each year and represent a significant handling charge against production costs in the form of dam and pond construction and water reclamation. These slimes have very poor settling qualities, and after many years of standing in open ponds, often retain 50 to 70 percent water. Apparently, the uranium in these slimes is tied up in the crystal structure of the micron size fluorapatite mineral, and no method has yet been devised which will economically release the uranium to solution. Under these circumstances, production of uranium appears unlikely until adequate process methods can be devised. The phosphate industry has considered the problem of slime handling for many years, and no economic solution has been found for completely dewatering washer slimes. The Commission's program has contributed some new fundamental information on this apparently stable system, but as yet, much remains to be done.

4. Florida Leached Zone

The P_2O_5 content of the Florida leached zone is in the range of 10 to 12 percent and can be concentrated by a simple sand-slime separation into a slime fraction which contains a P_2O_5 content above 20 percent. High grade phosphate rock of commerce has a P_2O_5 content higher than 30 percent. The aluminum and iron content in commercial rock is generally less than 5 percent total, whereas, these elements total in the range of 10-20 percent for leached zone. The converse is generally true for lime content.

In order to develop leached zone material as a phosphatic source material and thereby realize by-product uranium recovery from phosphate operations employing leached zone material, one faces the general problem of compensating in one way or another for the lower P_2O_5 grade. There are two possible procedures whereby this compensation can be achieved: (1) beneficiation, and (2) improved technology.

The commercial possibilities of the leached zone allow some flexibility from an uranium point of view. It is possible to consider the leached zone as having phosphorus, aluminum, fluorine, uranium, minor metal and nonmetal values, which can be treated as a source of alumina, P_2O_5, and uranium; as a source of alumina and uranium; or as a source of uranium alone. In considering these possible combinations of end products, there are a number of process routes available, each with its related economic problems. Considerable progress has been made for both three (P_2O_5-Al_2O_3-U_3O_8) and two-product (P_2O_5-U_3O_8) approaches in developing process technology which is applicable, and process work completed on the one-product (U_3O_8) approach has shown no insurmountable obstacles from a technical point of view.

The question of economically winning uranium from phosphatic materials is a challenge to everyone associated with this technical development, but its rewards will be numerous if full utilization of our phosphatic deposits and conservation of vital resources is attained. The phosphate and fertilizer industries as a whole are meeting this challenge with aggressive confidence.

SAND RECOVERY

(Continued from page 71)

imately 65 ft. with a total length of 570 ft. It travels at the rate of 369 f.p.m. The reclaiming belt conveyor discharges to another inclined belt conveyor that carries the material to a height of 65 ft. on top of the 650-ton, eight-compartment loading out bin. The sand goes directly into the bins, while the gravel is again run through a rinsing screen. Water sprays operate at 600 g.p.m.

All rail shipments are loaded from gates to retractable chutes on the sides of the bins which parallel the railroad track.

Trucks are loaded from two 11-cu. yd. weigh hoppers. Each is suspended individually from two 25,000-lb. Hardy dial scales. All bin gates and discharge chutes are controlled by air from one central point. This processed material can be loaded out in trucks at the rate of 175 to 200 cu. yd. per hr.

Ready-Mixed Concrete Plant

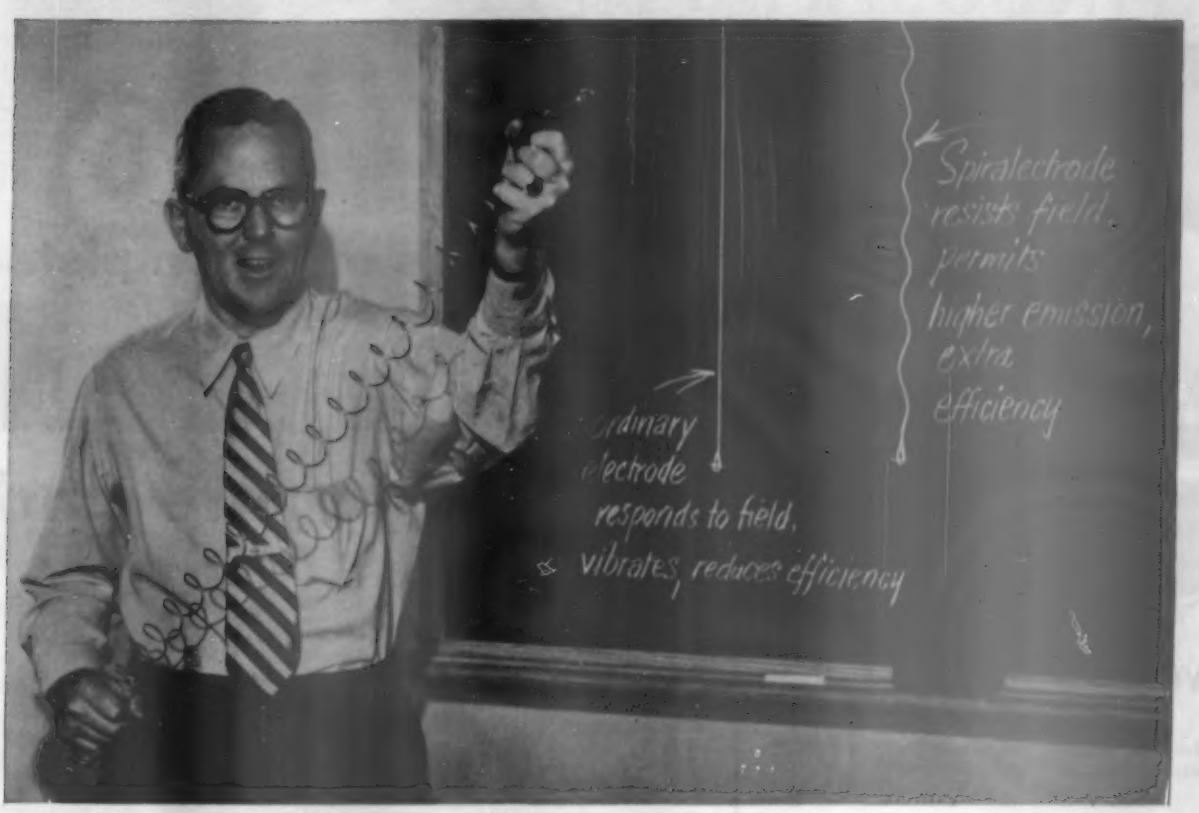
The office, loading out plant, and tunnel are now all connected by an intercommunication system, allowing for faster and more efficient operation. There is also a ready-mixed concrete plant at the Quigley site, set up in connection with the loading out bins, with a 24-in. conveyor for charging of material. The capacity of the ready-mixed concrete plant is approximately 600 cu. yd. per day.

"The opening of Fort Worth Sand and Gravel Co.'s new Quigley plant will enable us to serve more efficiently the needs of the construction industry of the progressive Fort Worth area," stated Chas. Marshall, executive vice-president, in announcing the opening of the plant.

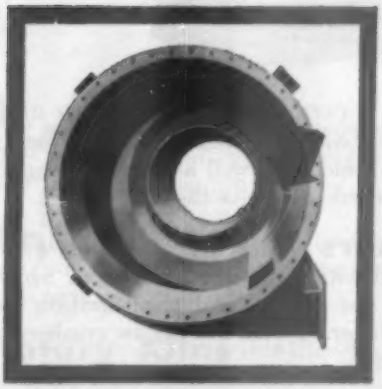
Gypsum Plant in Full Scale Operation

SUPERIOR GYPSUM CO. has made initial shipments of gypsum from its new mill located in the Bitterwater Creek area (Temblor Range), 30 mi. northwest of McKittrick, Calif. The crushing and screening plant, which represents an investment of more than $100,000, has a capacity of 65 t.p.h. (20-mesh material). Five men operate the mine and mill. Albert Chanley, head of the company, discovered the gypsum deposit two years ago. The plant will furnish gypsum for agricultural uses.

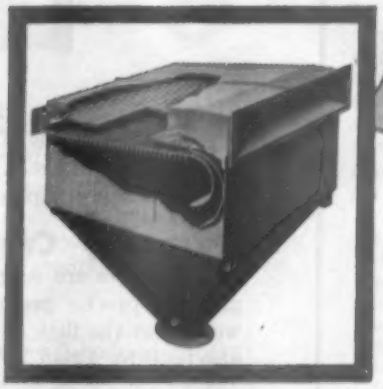
How Buell's Unique Spiralectrodes deliver EXTRA DUST COLLECTION EFFICIENCY!


Spiralectrode resists field, permits higher emission, extra efficiency
Ordinary electrode responds to field, vibrates, reduces efficiency

Coupled with the unique spiralectrode feature is Buell's Continuous Cycle Rapping—the most effective mechanism yet developed for dry dust precipitation. Completely eliminates puffing, keeps electrodes constantly clean. Re-entrained dust is minimized, peak efficiency is maintained.



Buell Cyclones also deliver extra efficiency, due to exclusive shave-off which harnesses double-eddy and puts it to work!



Buell's Low Resistance Fly Ash Collector combines top efficiency with low draft loss, for natural or forced draft installations.

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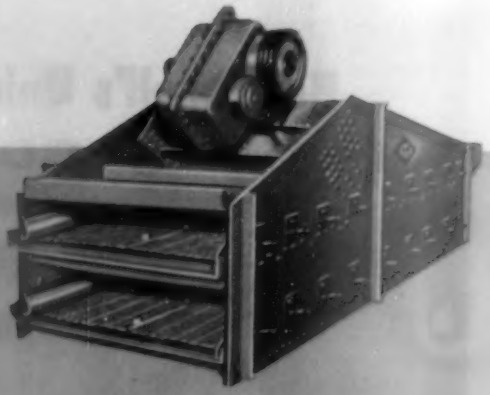

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1. Dollar per ton (or barrel) cost of expansion.
2. Volume per man-hour.

With these factors dictating the approach, expansion planning differs from plant to plant. In some operations, profitably meeting increased capacity requirements calls for complete replacement of outmoded equipment. In other plants, the answer lies in supplementing existing equipment and/or developing a more efficient flow. Considerations might also run toward reduced fuel consumption, power consumption, and maintenance. In the case of cement, it could also call for more grinding production or increased burning capacity. It could require better heat recovery or faster clinker cooling.

How Can Allis-Chalmers Help?

Allis-Chalmers manufactures hundreds of *different* types of processing machines. With the knowledge gained in solving tens of thousands of varied application problems, Allis-Chalmers is an organization that can help you avoid many "pitfalls" in your expansion effort. For full details, contact the Allis-Chalmers representative in your area, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wis.

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Allis-Chalmers, with a century of leadership and experience, builds all the basic machines used in producing aggregate and in making cement, as well as the motors and electric power equipment needed to drive them.

Gyratory Crushers — Most Allis-Chalmers gyratory crushers are supplied with hydraulic adjustment which provides precise product size control and compensation for wear — at the flick of a finger. A wide line of jaw crushers is also built by Allis-Chalmers.

Vibrating Screens — Regardless of screening problems there's an Allis-Chalmers screen designed to meet your specific need. Applications include scalping, medium and

Over Half of All the Cement Manufactured in U. S. is Processed in Allis-Chalmers Equipment

A-C ALLIS-CHALMERS

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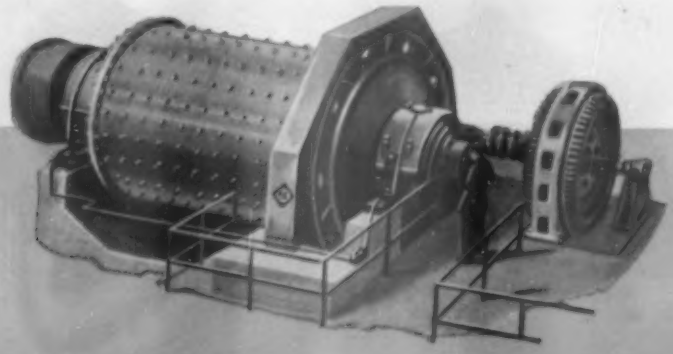

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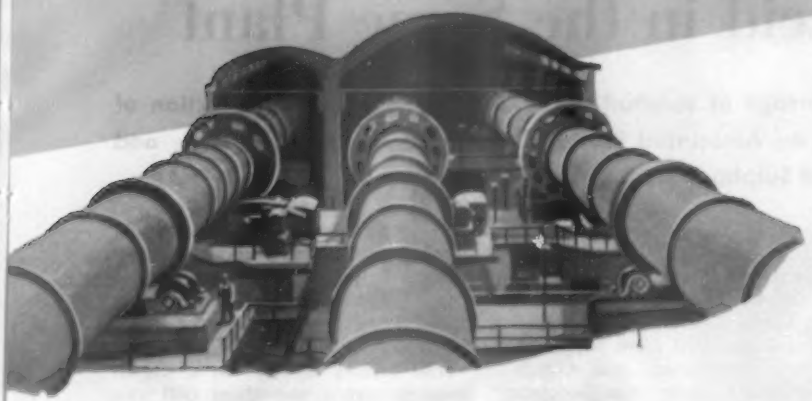

fine separation, wet or dry screening, rinsing and dewatering. The recently introduced general purpose Model AVS screen is the "talk" of the industry.

Grinding Mills — Allis-Chalmers manufactures all the proven mill designs, including those for producing specification or manufactured sand.

Rotary Kilns — Allis-Chalmers all-welded rotary kilns are built in standard and special sizes for a wide variety of uses, including cement manufacturing and the production of lightweight aggregates, lime, refractory materials, fertilizers, and chemicals.

"Manufactured" SAND from ALLIS-CHALMERS Rod Mills

An Allis-Chalmers rod mill converts unsalable material into specification sand. It prolongs productivity of natural reserves. It produces sand where natural sands are unavailable or unusable.

Processing specification sand or coarse aggregate from rock, and grinding aggregate or natural sand, are particularly abrasive and difficult jobs. That's why Allis-Chalmers rod mills are so well suited for the job. Basically, the A-C rod mill is a simple, rugged machine . . . a grinding mill that requires little attention, yet provides continuous dependable performance.

SPECIFICATION STONE at the Flip of a Switch

One-man, one-minute product control! In this truly modern crusher, *Hydroset* control provides a rapid and convenient means of raising and lowering the hydraulically supported crushing mantle. Adjustment to precise size is accomplished by the flip of a switch. Compensation for wear and fast emergency unloading are accomplished in the same easy manner.

Produces Cubical Product

Because of its small eccentric throw in relation to crusher setting, the *Hydrocone* crusher also helps you meet specification by producing a uniform, cubical product. With a smaller effective ratio of reduction during each crushing stroke, fines, slivers and flats are kept to a minimum.

Hydrocone and Hydroset are Allis-Chalmers trademarks.

CHALMERS

Motors, Control, V-belt Drives, Power and Electrical Equipment — All Built by Allis-Chalmers

Plant at Widnes, England, where calcium sulphate with other raw materials is calcined in rotary kilns to produce a cement clinker and gases containing sulphur dioxide which are converted to sulphuric acid

Making Cement Clinker and Sulphuric Acid in the Same Plant

• Shortage of sulphuric acid in England led to construction of plant by Associated Portland Cement Manufacturers, Ltd., and United Sulphuric Acid Corporation

By SPECIAL CORRESPONDENT

HEAVY DEMANDS FOR SULPHURIC ACID in Great Britain, and the need to use local raw materials in ample supply were the incentives which led to building a new plant in Britain, using calcium sulphate as the basis for manufacture of cement clinker and sulphuric acid in roughly equal quantities.

Eleven industrial users of sulphuric acid formed in 1951 the United Sulphuric Acid Corporation (familiarly known as U.S.A.C.), and Industrial Chemical Industries (I.C.I.) agreed to act as technical advisers for construction of the new plant at Widnes, Lancashire, England. Anhydrite (calcium sulphate) is supplied from the Long Leg mine in Cumberland. The Associated Portland Cement Manufacturers Ltd. buy the clinker from U.S.A.C. and make cement from it in a new plant, built adjacent to the Widnes acid factory.

The Widnes factory will use about 240,000 tons of calcium sulphate per annum, from which about 148,000 tons of sulphuric acid and 132,000 tons of cement clinker will be produced. Provision is made for a future 50 percent increase in output.

Rotary kilns and sulphuric acid plant nearing completion; firing end of kilns, to the right

The factory is built on a site of some 66 acres, and about 600 men were employed on construction work by Simon-Carves Ltd., and their various sub-contractors. The formal contract for construction was signed in October, 1952, and the first unit was commissioned in April, 1955.

The building of the factory has involved a substantial amount of work beyond the boundaries of the actual site. The largest work of this kind was the building of a pumping station at Fidler's Ferry on the river Mersey and the laying of two and a half miles of 24-in. underground pipeline to bring water from Fidler's Ferry to the Widnes factory. Another substantial undertaking was the laying of the 36-in. main drain (believed to be the largest alkathene drain in Britain) through which the plant effluent is taken away.

Plant and Process

In the anhydrate process, an accurately proportioned mixture of calcium

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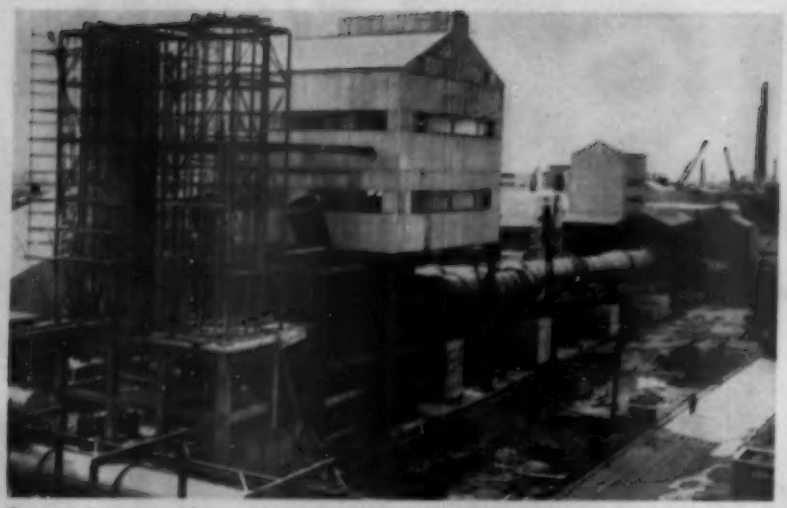

Construction view of kilns with feed end, left foreground, and structure for treating kiln stack gases to produce sulphuric acid

sulphate is heated with materials, containing carbon, silica, alumina, and ferric oxide, to simultaneously produce cement clinker and gases containing sulphur dioxide. The SO_2 gas is converted to sulphuric acid by the orthodox "contact" process.

The raw materials used at Widnes, in addition to anhydrite, are coke, sand and shale. Coal is also used, not primarily as a raw material but in pulverized form for firing the kilns in which the mixture is heated: its ash, however, inevitably forms part of the mixture.

The process comprises the following main stages:

(a) Handling and preparation of raw materials.

(b) Production of gas containing SO_2 with simultaneous production of cement clinker.

(c) Purification of gas produced.

(d) Conversion of SO_2 to SO_3.

(e) Absorption of SO_3 to form sulphuric acid.

Handling and Preparation of Raw Materials

Anhydrite is delivered dry by rail in 25½-ton freight cars. It is received by rail hopper and skip hoist, and can either be conveyed to a 12,000-ton storage dump for subsequent reclaiming by mechanical excavator and travelling hopper, or it can be conveyed direct to a pair of crushers with the product elevated to a storage bunker.

Sand, shale, and coke are transported by angle hoist to wet storage bunkers, from which they are delivered to two rotary dryers heated by combustion gases from oil burners. The dried materials are taken by a gravity bucket conveyor to dry storage bunkers.

Below the dry storage bunker outlets is a battery of automatic weighers feeding to a pair of belt conveyors. The weighers are electrically controlled and interlocked to give a feed of the correct proportions for producing portland cement clinker. The two conveyors deliver the proportioned feed to two ball mills, in which the materials are ground and mixed, after the mixture, now known as "raw meal," is elevated and delivered by an Airslide distributing conveyor to the raw meal storage and blending silos.

Raw meal from the silos passes through special feeding devices to the feed end of the kilns.

Coal is conveyed from dump to a storage bunker, feeding to three mills, which provide pulverized coal at the firing end of the kilns.

Production of SO_2 and Cement Clinker

The two rotary kilns, each 355 ft. long, are the heart of the anhydrite process. They are in general similar to orthodox cement kilns, but certain details are specially modified. They were manufactured by Edgar Allen & Co., Ltd., Imperial Steel Works, Sheffield, England.

The silica, alumina, and iron oxide in the sand, shale and coke, combine with the lime in the anhydrite to form cement clinker.

The clinker leaves the kilns through tubular coolers and is received in hoppers, from which it is taken by shaker conveyors to jaw crushers, and is then elevated to automatic weighers. From the weighers it is fed to clinker bunkers by conveyors with travelling trippers. From the bunkers the clinker is elevated to another pair of weighers, and is moved by belt conveyors to the adjacent works of Associated Portland Cement Manufacturers for processing into portland cement.

Gases leaving the two kilns are kept in two separate streams, which are cleaned, cooled and converted into sulphuric acid by what are in effect two similar plants in parallel.

The kiln gases are hot and dusty and contain mainly sulphur dioxide, oxygen and nitrogen. The bulk of the dust in each stream of gas is removed in a smoke box and cyclone. The gas then passes to a cooling tower over which clarified river water is pumped, cooling and saturating the gas and removing most of the remaining dust.

Each stream of cleaned and saturated gas then passes through a set of four pairs of electrical precipitators, in which the last particles of mist and dust are removed. In order to allow any two precipitators to be taken out of service for cleaning or repair, an extra pair of precipitators is provided, that can be used on either gas stream.

Conversion of SO_2 to SO_3

The sulphuric acid plants, as stated, operate on the orthodox "contact" system, the two units being identical in all respects except that one of them incorporates an oleum tower.

Each gas stream from the precipitators passes through a drying tower, in which water is removed by countercurrent circulation of strong sulphuric acid. The dried gas then passes through blowers into a three-stage converter, in which, in the presence of a vanadium catalyst, the sulphur dioxide and oxygen in the gas combine to form sulphur trioxide. This process of oxidation is exothermic (i.e. productive of heat), and heat exchangers are accordingly used between the stages of conversion in order to maintain the gas at a suitable temperature. The sulphur trioxide is then passed through three annular cooling towers in series, the last of these towers being water-cooled.

Forming Sulphuric Acid

Each sulphur trioxide stream then passes through two absorber towers, in which it is absorbed in strong sulphuric acid, part of the sulphur trioxide in one stream having been absorbed in the oleum tower. The strength of the acid leaving the absorbers is kept constant by dilution with water, and the net "make" of acid thus obtained is pumped to storage. From the storage tanks it is pumped through loading arms to either road or rail tankers.

Traces of unconverted sulphur dioxide in the gas streams leaving the absorbers are removed in tail gas scrubbing towers before the tail gas is released to atmosphere.

Illustrations by courtesy of Edgar Allen & Co. Ltd., Sheffield, England.

FLUIDIZED DRYING AT MARQUETTE CEMENT'S GEORGIA PLANT...

FluoSolids Reactor at left, air heater at right.

Another first for fluid techniques came about early in 1955, when Marquette Cement Manufacturing Company started up this FluoSolids System at their Rockmart, Georgia Plant. Designed to dry ¼" limestone containing 3.5% moisture, the system processes 40 tons per hour of feed to the raw mills. Compared with the conventional dryer which it replaced, the FluoSolids System has greatly reduced labor and fuel costs at the same time saving considerable floor space.

Other advantages of the FluoSolids System for drying are simplicity and ease of operation and low maintenance due to absence of moving parts in contact with abrasive dust. Start-ups and shut-downs present no problem and the system can produce a dry limestone product from which fine clay has been separated.

For dry process cement manufacturers, fluidization represents a new and better method of de-dusting and drying limestone and cement rock.

For more information write for a copy of Bulletin No. 7502, Dorr-Oliver Incorporated, Stamford, Conn.

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Sand Island plant where reef shells are rewashed and sized for chicken feed to be shipped to Baltimore, Md.

Radcliff Gravel Diversifies
By Developing New Products and Markets

• A large producer of sand and gravel and reef shell aggregates, the Radcliff Gravel Co., Inc., Mobile, Ala., has extended its activities into ready mix, concrete block and bituminous mix production

By HUBERT C. PERSONS

FOR NEARLY HALF A CENTURY the Radcliff Gravel Co., Inc., of Mobile, Ala., has been building a business by developing products and the markets for them. Today, it is one of the Deep South's major producers of paving and masonry materials, and aggressively pursues its policy of being alert to new ideas and techniques.

R. H. Radcliff, Sr., founded the company in 1908, and for many years sand and gravel aggregate was the principal product. Today its volume of sand and gravel continues to increase, but another aggregate, oyster shell, is far ahead in tonnage. Radcliff pioneered in promoting shells for the purpose in the area.

Following the death of its founder, the company was reorganized in 1945 as a subsidiary of Southern Industries Corporation and R. H. Radcliff, Jr., became president. He now also is president of Southern Industries.

In 1946 the company's experiments with crushed oyster shells proved that not only were shells more economical, but also offered advantages as a paving aggregate and sub-base material. For centuries millions of tons of dead reef shells in Mobile Bay had gone virtually unnoticed until Radcliff recognized their value. To reclaim them, it utilized equipment from its dredging division, which previously had concentrated on removing sand and gravel on river bars above Mobile.

By 1947 the shell dredging operation had grown to such proportions

Dredge Shearwater pumping sand and gravel from the Alabama River

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THE cartridge grease seal used on Link-Belt belt conveyor idlers provides the effectiveness of multiple sealing with the convenience of a single unit. A contact seal of laminated felt and neoprene combined with a labyrinth keeps dirt out, grease in. And the grease itself within the labyrinth further prevents entrance of dirt or other matter. What's more, no springs or loose washers are involved . . . there's no chance for metal-on-metal friction. The entire assembly comprises a rugged, compact "cartridge."

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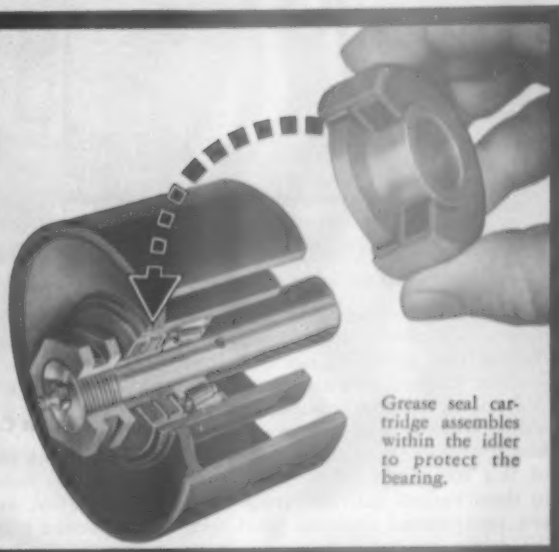
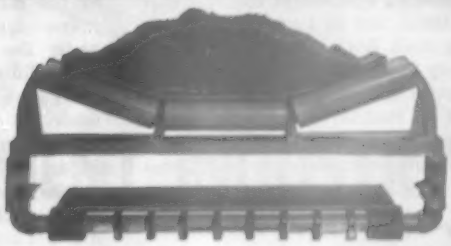


Grease seal cartridge assembles within the idler to protect the bearing.



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1. **HUSKY, HIGHEST QUALITY BEARINGS,** free and easy turning, assure maximum life, minimum belt-wear, low power consumption. Concentricity is secured by unit mounting of bearings in a heavy-wall center tube.
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3. **CONCENTRIC ROLLS** have smooth surfaces and rounded edges. Machine-made, continuous welds prevent entrance of dirt and moisture.
4. **HOP-FREE ROTATION** is assured by close tolerances, press fits and precision assembly from shaft to shell.
5. **STRONG, RIGID FRAMES** support rolls in perfect alignment. Rolls are securely held in place but can be easily removed for inspection and service.
6. **GROOVED HEX NUTS** lock into malleable brackets, creating bridge truss effect—prevent shaft rotation and bracket spreading under load.

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Part of the mixer truck fleet with batching plant in background

that Radcliff's dredging division was incorporated into a separate company, Bay Towing and Dredging Co., Inc., another Southern Industries subsidiary.

But the interesting business of dredging, processing and developing markets for oyster shells is only one phase of this company's interests. Included in these various activities are a modern ready-mixed concrete plant with 27 mixer trucks; a concrete block plant making lightweight concrete masonry units; and an asphalt plant, producing both hot and cold mix. Distributing yards for concrete block and aggregates are also operated in Pensacola, Fla. Radcliff Gravel Co. is one of the largest producers of concrete and asphalt materials in the Gulf Coast area.

Ready-Mixed Concrete Operation

Most of the 27 ready-mixed concrete trucks are International and G.M.C. tandems with 5 to 7 cu. yd. Jaeger agitator mixers. All the trucks are equipped with two-way radios on a system leased from the Southern Bell Telephone Co.

Portland cement from the Ideal Cement Co.'s Mobile plant is delivered in hopper bottom railroad cars. Unloaded by gravity into an under-track hopper, the cement is carried by screw conveyor to a Blaw-Knox bucket elevator which takes it to the main batching tower.

Sand and gravel aggregates, delivered by barge and stockpiled in the plant yard, are lifted to the batching bins by Manitowoc or Lorain crawler cranes. In addition to the main ready-mixed concrete batching plant there is also a semi-portable dry batching plant which can be set up at job locations, if desired.

A 2-cu. yd. Koehring mixer in the central batching plant is equipped with automatic air control gates on all hoppers. Water is measured by a Neptune meter. Deliveries of ready-mixed concrete are made within a 30-mile radius of Mobile. Up to 157-cu. yd. can be delivered on one round.

Lightweight Concrete Block Plant

The block plant has a daily capacity of 16,000 concrete masonry units, 8 x 8 x 16-in. equivalents. Most of the production is in lightweight units, using "Enslite," an expanded slag made by the Birmingham Slag Co., as the coarse aggregate. Products are sold under the trade names, "Radstone" and "Cliffstone," the latter being a split block. Sand and gravel block also are made.

Block plant equipment includes a Model V 3 R Besser Vibrapac block machine with front pallet feed, and a 50-cu. ft. Besser mixer equipped with a P & S automatic moisture meter.

Slag aggregate is delivered by rail in hopper bottom cars. The three Blaw-Knox bins in the batching plant have a capacity of 120 tons of aggregate and 375 bbl. of cement.

Curing is done in six low pressure steam kilns. Steam at atmospheric pressure is turned on for 2 hr. or until kiln temperature reaches 180 deg. F. Block soak in the steam for 3 hr. after which they are placed in under-cover storage to be air-cured for 30 days.

Yard equipment for the block plant includes a Stearns cubing hoist and four 6000-lb. capacity fork lift trucks. Two of the lift trucks are Yale and two are Towmotor units. Block deliveries are made within a 100-mile radius of the plant. A fleet of six 32-ft. tandem trailers, three Fruehauf and three Dorsey, are used to make block deliveries. Three of the trailers are pulled by Mack diesel engine trucks, one by an International, one by a White and one by a Chevrolet.

Block distributed from the retail yard in Pensacola are delivered there by barge. Using two lift trucks, 35,000 block can be loaded on or unloaded from barges in 6 hr.

Both sand and shells are stockpiled in the plant yard in Mobile which occupies a 10-acre tract on the Mobile river. About 1500 tons of shells are delivered by barge each day. Clamshell cranes move the sand or shells from barge to stockpile.

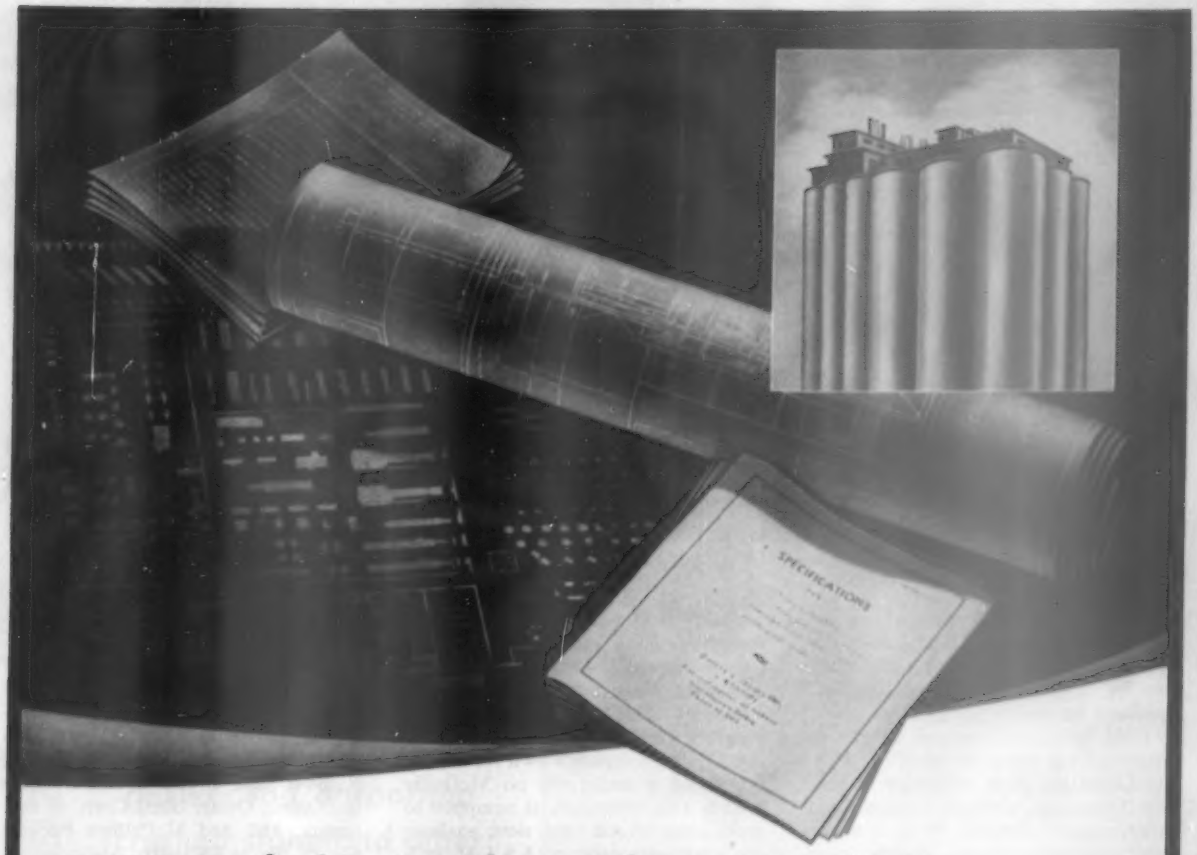
Bituminous Mix Plants

Shells for the bituminous mix plant are washed free of silt and mud by washers on the dredges before they reach the plant. Maximum shell size when taken from the barge is about 3-in. After passing through a Cedarapids rotary dryer, in which the temperature is kept at 300 deg. F., the shells go to an 18-in. Allis-Chalmers hammermill set for ¾-in. maximum size. The shells and sand from hoppers move by gravity to a series of vibrating screens where the products flow into 300 deg. F. hot bins, according to particle size. Gradations are from ¾-in. to ¼-in.; ¼-in. down to No. 6, and from that size down to dust. The shell crushing operation in the hammermill usually provides a sufficient percentage of minus 200 material. A typical shell asphalt mix contains 60 percent shell and 40 percent sand, all passing a No. 4 screen.

The central bituminous mix plant has two Cedarapids hot mix plants of 4000-lb. batch capacity. The asphalt is kept in a battery of storage tanks or vats maintained by steam jackets at 300 deg. F. The bituminous mix plant tower contains the screening units, the hot bins for various sizes and a mixing unit in the central portion. The lower section of the tower is open to allow trucks to run under the pug mill hopper gates.

A control panel in the batcher is manually operated by levers controlling a weigh box for the aggregates and a weigh bucket for the asphalt. The hot aggregates are introduced into the pug mill and mixed dry for 15 sec. The asphalt valve is then opened and a measured quantity of asphalt released into the pug mill. The mixing is continued for another 45 sec. after which the hot bituminous mixture is ready for dumping into trucks. These contractors' trucks haul from 9 to 15 tons in each load. The hot mix is for immediate placement and cannot be stored for any considerable length of time.

Batch preparation for cold mix asphalt involves the same procedure as for hot mixes except that the temperature of the aggregate is reduced to a maximum of 175 deg. F. and kerosene is introduced into the pug mill as a liquifier just prior to adding the asphalt. The mixture is then ready



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View of plant from river front showing ready-mixed concrete and bituminous plants and part of aggregate storage

to be dumped into trucks or cars for use on jobs as required. The cold mix remains usable for several months and can be readily placed by mechanical spreader or motor patrol.

Cold mixes are shipped by rail in open cars for use as far away as southern Louisiana, all of Mississippi, southern Tennessee, southern Georgia and southwestern Florida. It is used by city street departments, county, state and federal agencies for both road and street maintenance and new construction. It is also used by paving contractors on projects where it would not be economical to set up their own central asphalt plant.

Plant mixes are varied to meet specifications of various government agencies. Plant capacity is about 90 t.p.h. for each plant.

The bituminous mixes, using shell aggregate, cost about $2 per ton less than the mixes prepared with other crushed aggregates, according to E. C. Meredith, superintendent of the asphalt plant. Mr. Meredith was formerly an engineer with the Flexible Pavement Branch, Engineering Research Division, U. S. Waterways Experiment Station at Vicksburg, Miss.

Research Program

To establish a sound basis for the promotion of various applications of dead reef oyster shells, the Radcliff company sponsored an extensive testing and research program carried out by Southern Laboratories, Inc. of Mobile. The program included tests of concrete with shell as coarse aggregate, tests of sand-stabilized and cement-stabilized shell bases and shell asphalt paving mixtures. More than 350 concrete cylinders of 85 different mix designs were tested. The procedure included 500 Marshall stability tests on shell bituminous mixes, triaxial shear tests, California bearing ratio tests and other physical and chemical determinations. This research and testing program supplements the routine work done in the company's own laboratory occupying a leased site on McDuffie Island. This laboratory is equipped to make compression tests, sieve analyses and carry out standard A.S.T.M. procedures. The site is also used for stockpiling both finished and unfinished aggregates and shells.

Uses of shell aggregate recommended by the company are for shell concrete, shell bituminous mixes, cement stabilized shell and sand stabilized shell.

Technical information issued by the company defines shell concrete as a structural concrete suitable for roads, sidewalks, parking areas, foundations and general construction purposes where extremely high strength is not required. Compression strengths ranging from 2000 p.s.i. to 3500 p.s.i. were reported with 5, 6 and 7-sack mixtures and a water-cement ratio of 8 gal.

Cement-stabilized shell consists of 7 percent portland cement with wet shell and whatever water is required. This is used as a base course for flexible pavement and for parking lots or driveways where traffic will be light.

Sand-stabilized shell consists of 25 to 50 percent sand blended with wet shell in a pug mill or at the job site. When properly placed and compacted it is said to provide an adequate base for either asphalt or concrete airport runways, roads and streets. Crushed shell is also used frequently in southeastern states for driveways and parking lots with no treatment other than compaction by traffic.

The Radcliff Gravel Co. is a subsidiary of Southern Industries Corp., R. H. Radcliff, Jr., being president of both concerns. Other subsidiaries of Southern Industries are the Bay Towing & Dredging Co. and Southern Oyster Shell Milling Corp., of Mobile; Richton Sand & Gravel Co. of Richton, Miss., Oyster Shell Corp. of Baltimore, Md. and McPhillips Packing Co. of Bayou La Batre, Ala.

The Bay Towing & Dredging Co. operates three shell dredges, one sand dredge and one gravel dredge. In addition to oyster shells these dredges supply the Radcliff company with sand and gravel for its ready-mixed concrete and block plants. Oyster shells found at an average depth of 11-ft. are dredged from what are known as dead oyster reefs under the silt and sand bottom of Mobile Bay. The reefs vary in thickness up to more than 20 ft. Sand and gravel aggregates are dredged from the Alabama, Mobile and Tombigbee rivers as far away as 135 miles from Mobile. Oyster shells and the other aggregates are delivered to the Radcliff plant in Mobile by barge.

Oyster shells are used as a source of calcium carbonate in the manufacture of portland cement by one cement plant in Mobile. Bay Towing barges also deliver the shells to the Southern Oyster Shell Milling Co. which has a processing plant on McDuffie Island in Mobile. Here the shells are washed, crushed, screened, dried and bagged for shipment to Baltimore to be converted into chicken grit. A 30-in. Continental Gin Co. belt conveyor is used to load the shell bags on shipboard.

The five dredges operated for the Radcliff company were either built to

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This remarkable new Hewitt-Robins conveyor belt reinforced with the revolutionary synthetic fabric, Super Raynile, makes possible an entirely new concept in single-section conveyor application. It solves difficult materials handling problems where topography and other conditions require the use of a long single-length conveyor.

Already in service, Super Raynile has the highest operating tension of any conventional carcass belt. Because of its tremendous tensile strength, 400% greater than conventional cotton reinforced belts, a single conveyor section *5¾ miles long* can be built over level terrain to carry material at 400 TPH using only a 6-ply Super Raynile belt 30 inches wide. This same belt can also lift material from ground level to a height of 830 feet.

The new Hewitt-Robins Super Raynile conveyor belt is highly flexible and pliable despite its great strength. Its cost is less than steel-reinforced belts and Super Raynile can easily be spliced in the field more quickly, more economically and without the specialized equipment required to splice steel-reinforced belts.

Super Raynile belt is available in a wide range of specifications . . . widths up to 72" — thickness up to 15 plies.

Learn more about this new long-length, long-life conveyor belt. Contact your local Hewitt-Robins Industrial Supply Distributor (see Classified Phone Book), or write direct to "Super Raynile Belt", Hewitt-Robins Incorporated, Stamford, Connecticut.

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Tugboat arriving from dredge with long tow of barges laden with oyster shells

order or were modified to perform special functions. Washing and preliminary screening of shells and other aggregate is done on the dredges. All the dredges are named for water fowl.

Dredging Equipment

The dredge Pelican, built in 1946, has a 12-in. Amsco pump, a 320-hp. Atlas diesel engine, and a 500-hp. Superior generating unit. It is also equipped with a flat screen washer plus two Aiken classifiers. By this means two sizes of shell or a combination of sizes can be delivered.

The dredge Shoveler, purchased from the Hayden Dredging Co. of Houston in 1950, has been modified to fit the company needs. It is equipped with a 12-in. Amsco pump, 500-hp. Fairbanks, Morse diesel engine and a flat screen washer.

The dredge Shelldrake, bought from the Stevens Dredging Co. of New Orleans in 1951, has a 12-in. Amsco pump, a 500-hp. Superior diesel engine and an Allis-Chalmers rotary-type washer.

The Shearwater, a newly built sand and gravel dredge, has a 12-in. Amsco pump, a 320-hp. Atlas diesel engine and a 500-hp. Superior generating system. It is equipped with three Cedarapids vibrating screens and two Eagle washers. Barges may be loaded by conveyors on either side of the dredge.

The Kingfisher, the oldest dredge of the fleet, was originally a pipeline dredge for another company and later a sand dredge. It has an 8-in. Amsco pump and a 120-hp. Atlas diesel engine. In 1953, a Charles E. Wood classifier was installed on the Kingfisher to aid in producing aggregate gradations to meet various specifications of government agencies.

In the task of supplying aggregates to the Radcliff company, Bay Towing operates two 350-hp. tugs and four 900-hp. tugs in addition to various small craft used as dredge tenders. The service also requires 58 barges including six which are 240-ft. long by 45 ft. wide with a capacity of 3000 tons. These various functions performed by Bay Towing employ 250 men. Earle Self is manager of Bay Towing. The Radcliff operations employ 100, including office personnel.

Executives of Radcliff Gravel Co., Inc. include: R. H. Radcliff, Jr., president; D. E. Dawson, Jr., executive vice president and treasurer; Leon Torbert, secretary; E. B. Trice, manager Radcliff; J. O. Verneuille, assistant to the president; J. M. Morrissette, general superintendent; L. H. Maury, concrete superintendent; R. R. Murphy, production manager; and E. C. Meredith, asphalt superintendent.

Construction Boom Continues

MID-1955 finds the construction industry operating at record levels with no sign of a downturn, according to Dr. George C. Smith, economist for F. W. Dodge Corp. Construction contract awards in the 37 eastern states in the first six months of 1955, as compiled from Dodge Reports, totaled nearly $12 billion, or 30 percent ahead of the previous record which was established only last year. Each month except May represented a record.

Dr. Smith noted the following significant features:

1. There has been a very sharp reversal of the downtrend in industrial construction which followed the Korean War, far beyond the expectations of government and private forecasters. The upturn this year has been very broadly based, affecting nearly all major categories of manufacturing. Awards for manufacturing buildings totaled $850 million, some 46 percent ahead of the corresponding figure for last year. The stone, clay, and glass products group was up 341 percent.

2. Contracts for new residential construction have continued to show large increases over the preceding year, with practically all of the emphasis on single-family homes. Apartment construction accounted for a smaller proportion of residential building in the first half of 1955 than in any corresponding period on record. Residential contract awards totaled nearly $5.5 billion in the first six months, 37 percent ahead of the previous record shown in 1954.

3. Every major category of construction showed increases over last year, most of them substantial. Awards for commercial construction totaled over $1 billion, about 21 percent ahead of last year, the previous record; public works, $1.7 billion or 25 percent over 1954, the previous record; highway construction, $1.1 billion, or 42 percent over 1954, the previous record; and utilities, $685 million, or 38 percent ahead of 1954.

4. The smallest increase in any major category, rather surprisingly, was in educational buildings, up only 4 percent. The educational total was huge, however, amounting to slightly over a billion dollars for a new all-time record.

Dr. Smith concluded that "since construction contract awards precede actual construction, the extremely high levels reported in the first half of 1955 indicate that construction activity in the second half of the year will remain very high, and that the year will almost certainly establish a new record for construction put in place.

"There has been, in recent months, no indication of a downturn underway," Dr. Smith added. "In June, the latest month, total awards were 30 percent ahead of June 1954, exactly the same as the increase for the whole six-month period and far above the 13 percent increase of May 1955 over May 1954."

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Mack trucks, like the 22½-ton LV's shown here, are always on the job . . . moving ore, earth, and overburden. Under huge shovels on the lowest pit levels . . . up difficult grades . . . to processing or dumping sites, these untiring Macks move with power to spare—on year-in, year-out service.

For maintaining uninterrupted 24-hour schedules, for reducing operating and maintenance costs . . . quarry owners and operators find there are no equals to Macks.

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Photos taken at the Johns-Manville, Matheson, Ontario, open pit asbestos mining operations.

ROTARY KILN
Its Performance and Development

• Concluding article of the series summarizes the advantages claimed for the segmented kiln, and describes how rotary kilns so equipped may be designed and operated

By VICTOR J. AZBE

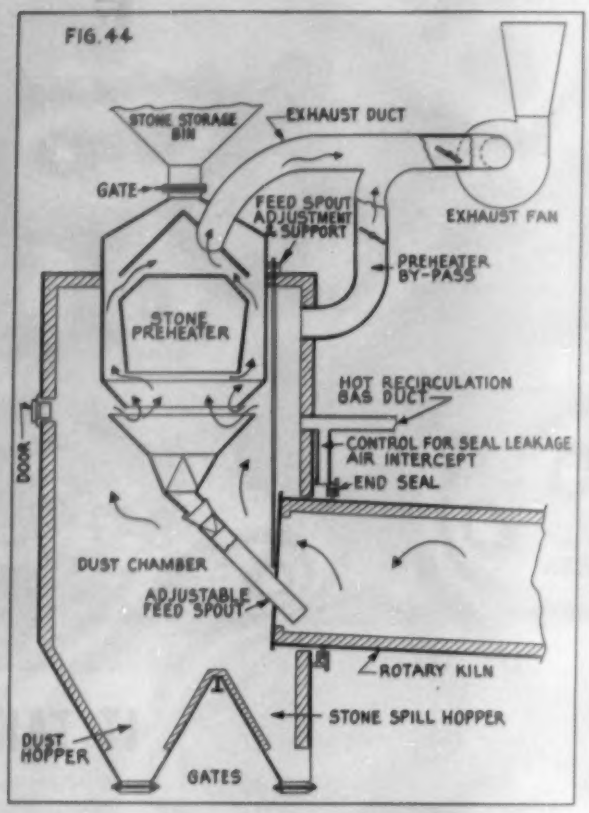

Fig. 44: A version of counterflow rotary kiln preheater

IN THE OPERATION of the Azbe segmented kilns, stone from the supply bin goes first to the "static stone preheater," an active unit of small capacity and limited preheating range. Here stone is retained for a short period in intimate contact with the escaping gases flowing at high speed required for a rapid rate of heat transfer.

Its purpose is twofold; to accomplish the cooling of the escaping gases to the lowest possible level through the direct contact of the gas and the stone and to remove some of the suspended dust from the escaping gases.

The gas passes through a limited, uniform stone bed thickness. It is limited because variations in stone size combined with the dust in the gas may present operating difficulties, and the uniform bed thickness assures suitable gas distribution. However, in case of a shut down, with stone flow interrupted and the bed choked with dust, a by-pass is provided for use until active stone flow is again established.

This section, Fig. 44, is called the "static stone preheater" to distinguish it from the rotary kiln section where stone is also being preheated. The static unit, however, is more efficient. Since it can also be the most troublesome, it is used only in combination to the safe but limited extent.

From the terminal cooler, the stone passes to the kiln through an adjustable feed pipe, the vertical position of which determines the stone load in the kiln. It is important to always maintain a full kiln load of stone as this is more reliable than when feeders are used.

The first section of the kiln is open, then the stone enters the progressive section, consisting of spirals of special deep design which tend to advance the stone as well as give the gases an energetic rotary action. The purpose is to scrub the remaining stone surface for better stone preheating and to project the coarser portion of the dust through centrifugal action to the kiln wall and stone surfaces.

In view of the fact that the hot section of the kiln is substantially segmented, the gases leaving it are of low enough temperature to safely permit the use of metallic spirals.

Since the escaping gases at the exhaust fan are of a low temperature, high draft also may readily be obtained for use in attaining high gas velocity in the static stone preheater and induce a cyclonic action within the kiln by the spirals at cross section "A" in Fig. 42, page 120.

Following this is the hotter and more active kiln area, divided by means of specially laminated refractory blocks into several distinct sections. This not only divides the stone, but also the gas into several separate streams, thus greatly increasing the surface onto which the gases may confer heat and from which the stone and lime may abstract it.

There are many other advantages in this segmentation, but the most important, in addition to the increase of heat transfer surface, is that the segregated fines normally hidden become exposed repeatedly during each revolution.

Segments extending into the hottest section of the kiln make much of this possible. This is based on the finding that if quadrants are so extended, due to increased heat absorption, temperature of the hot zone will be lowered sufficiently to permit such extension without dangering the quadrant structure. Without such a deep extension, much of this rationalizing plan would be defeated as it is essential that the rate of heat absorption be brought in step with the rate of heat generation which is possible only through this extension.

For a short distance beyond the edge of the quadrant section, the kiln is open. Within this open section, mixing of air with the combustible, ignition and precombustion takes place, together with some heat absorption. In the main, however, this is the carburetion section with most of the combustion and most of the heat absorption taking place within the quadrant section.

At the outlet of the kiln there is a dam, the purpose of which is to retain the load of lime within the open section of the kiln established by the adjustable feed pipe and the spirals.

This dam also constricts the gas-air inlet, permitting a more complete and rapid mixing, quicker ignition and

*Pres., Azbe Corporation, St. Louis, Mo.

The Wear

Wasn't There

Because The Price Didn't Permit Building It In

A few dollars more on a pair of shoes is the best investment if they give you a third to one-half longer "mileage." In grinding balls as in shoes, the measure of your money's worth is how much wear you get for your money.

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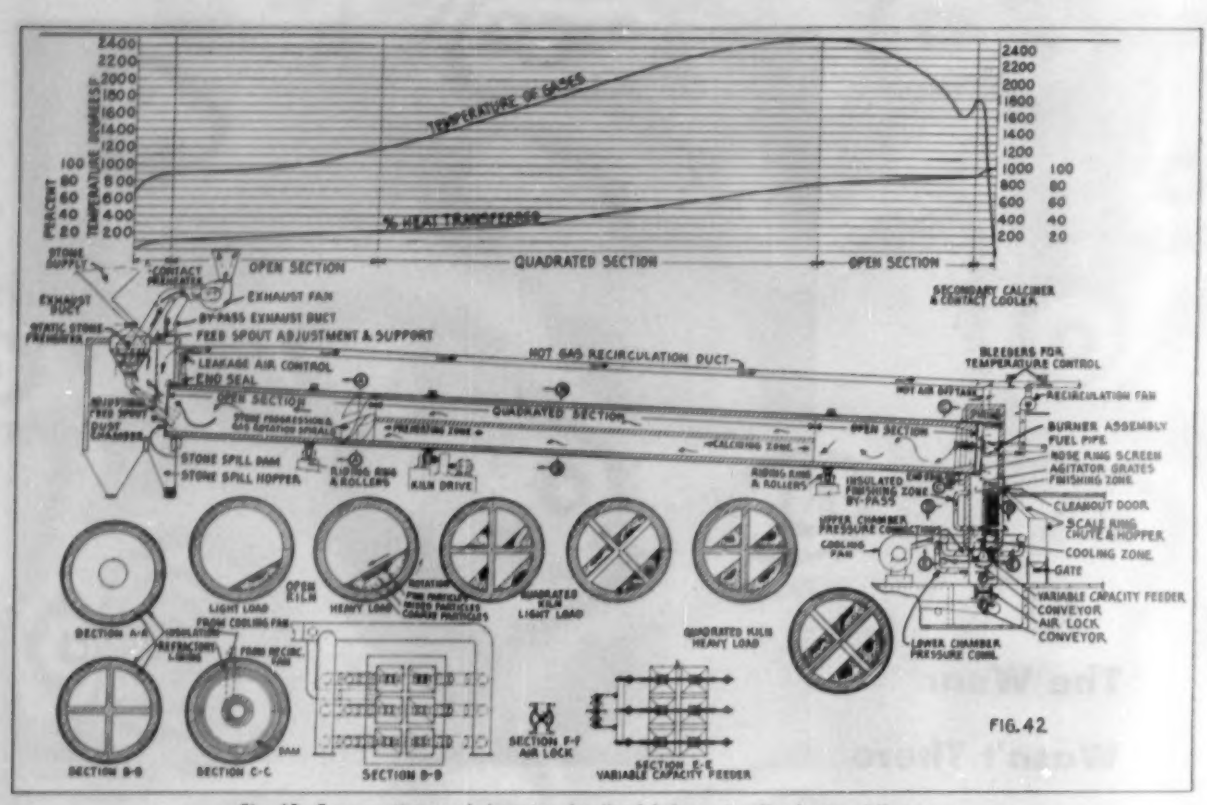


Fig. 42: Cross sections and elevation details of Azbe rationalized rotary kiln system

temperature build-up which is desirable since the lime, once hot, should be maintained hot until its calcination is completed in the vertical finishing zone.

The lime may discharge over the dam in a distributing stream directly into the "secondary calcining section" of the "recuperative unit," or it may pass through an activated grate, from which the occasional spalled off brick is removed and directed to a special compartment.

If lime is present in an extreme mixture of sizes, as, for example, in the case of materials passing through cement kilns, or when it has special disintegrating tendencies, then a heat resisting metallic "discharge screen ring" is attached to the kiln, the purpose of which is to classify the material into two streams and discharge them into separate sections of the "secondary calciner."

At this point, the lime coming from the kiln may not as yet be completely calcined. It is not even desirable that it be, as complete calcination is to be achieved in the finishing zone with a prolonged retention time.

Complete terminal calcination, of course, can be accomplished in the rotary section of the system, but only at the expense of considerable additional kiln length, higher temperature, greater radiation loss, lowered capacity, reduced fuel economy, increased cost upkeep and impaired lime quality. The purpose of the "secondary calciner" is to avoid all of the above and to utilize the sensible heat of the over-hot lime to complete calcination of the remainder.

The purpose of this unit is two-fold; first, to complete calcination, and second, to cool. But if cooling is too fast, calcination may not be completed, and if stress is put on calcination, then complete cooling may not take place. Therefore, the system was designed to be double stage.

A further complication was the tendency toward material and gaseous flow stratifications. Lime may pass down one side while air may flow up another, resulting in imperfect cooling. To overcome this, the system was made cellular, consisting of several small units, from which discharge, as well as air admission, could be independently controlled.

The system has both vertical as well as horizontal divisions. Through the lower sections a large amount of air is passed to accomplish complete cooling, most of this air being bypassed to the kiln. Through the upper sections only a small but definite amount of air passes, gauged to give the lowest CO_2 concentration and therefore most ready calcination.

Control is simple. In cooling, either air supply or lime withdrawal is regulated at the various sections so lime coming off is within a very limited number of degrees of the temperature of the cold air entering.

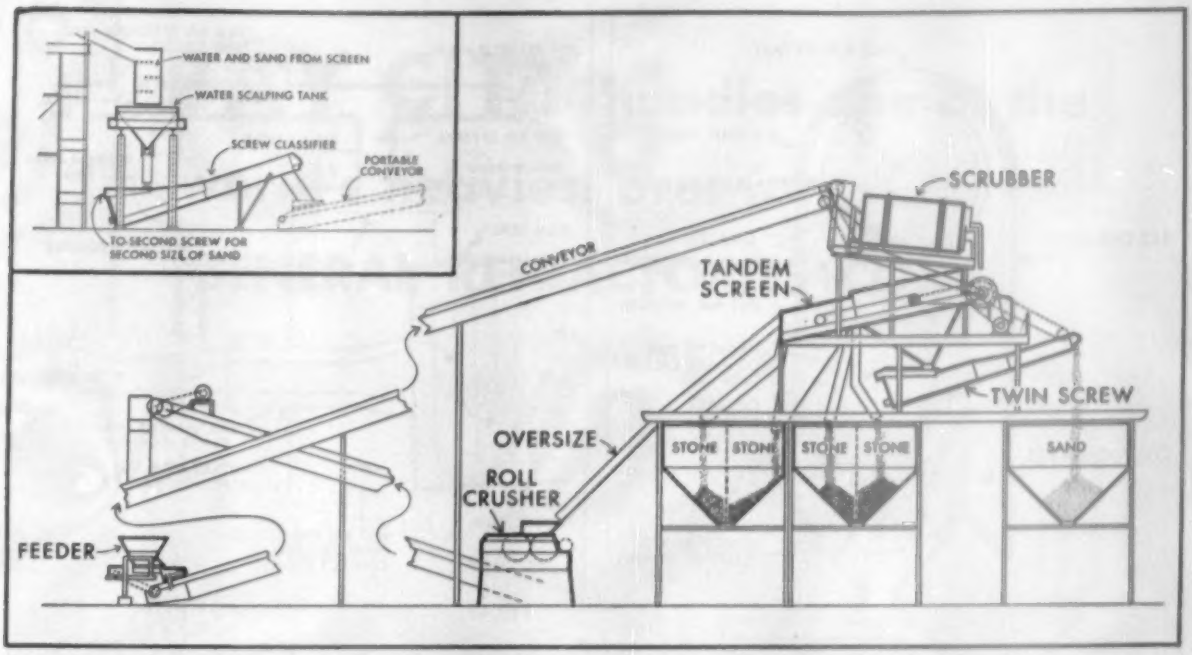
In respect to secondary calcination, by-pass air damper is regulated so that lime passes into the cooling section at a temperature of 1400 deg. F. By-pass air offtakes are otherwise controllable by slides located in slotted pipe. Offtakes may also be built into side walls.

The base of the "recuperative cooler" is pressurized and air sealed. Air may be allowed to enter the section by many ways and lime may also be drawn by various systems. Small magnetic discharge feeders, for example, could be utilized, and the entire control accomplished semi-automatically from the firing floor.

Thick walls of the secondary calcination and lime cooling unit are constructed with an insulating fire brick. Wall exposure is small and heat leakage low.

Combustion and Gas Flow

Whatever the fuel may be; oil, producer or natural gas, or pulverized coal, the fuel burning arrangement should only be varied slightly from that shown by Figs. 42 and 47. The aim is to control rapidity of combustion, tempering of heat, creation of luminosity, manipulation of mixing,



Why this "packaged" washing plant fits big-job operations

Produces up to seven sizes at 150 tph clip

Here's a big package-type washing plant that will supply huge quantities of thoroughly cleaned and sized sand and gravel to fill every demand made by your job, *no matter how big!* It's PIONEER'S new 405-W Washing Plant.

150 tons per hour is a lot of production in any language. **Yet the new 405-W not only gives you this tremendous output but also enables you to produce 2 different sizes of sand and 5 sizes of stone *simultaneously*, including oversize, which you can crush and run back through the screens. If you need fewer sizes, production can be even greater! For example, users report 200 to 215 tons per hour when separating and washing three sizes of gravel and one of sand!**

Secrets of high production

Big-plant proportions are one reason for such high production, but it takes *three* secrets, other than size, to process such huge quantities.

The first secret is the way in which the vibrating screen functions. This 4' x 20' tandem screen simultaneously separates up to 5 sizes of material, plus oversize, chuting four sizes of aggregates to storage bins, one size of sand to the dehydrator, and oversize to the crusher for reduction. A second size of sand can be produced when desired.

Utilization, rather than *rejection* of oversize is the second production secret. All oversize scalped off by the screen is chuted to a PIONEER roll or jaw crusher for reduction and fed back to the plant for re-processing.

Maintaining an even, continuous flow of material through the plant is the third production secret. PIONEER'S Model 30G Mechanical Feeder maintains the steady, even flow necessary for maximum production.

How second size of sand is obtained

Plaster or mason's sand can be produced by the addition of a second dehydrator to receive the overflow of water which carries such material from the first dehydrator. Recovery of this very fine sand results in additional profit to you and completely eliminates any waste. A water scalping tank can be added to the plant for maximum recovery of sand down to 200 mesh or finer. (See inset.)

Other important features

Maintenance costs are low, as all drives are simple. Individual electric motor drives on each unit mean fewer sprockets, shafts, gears, belts and chains to wear out.

Labor costs are low, as 2 operators can control entire plant. One regulates feeding, while the other checks material hauled away.

Additions and alterations are simple to make. Jaw or roll crushers can be added or omitted. Dehydrators and bins may be changed and other units such as a water scalping tank added to meet specific needs. Stockpiling conveyors can be added to handle any or all of the sizes produced.

Varying material specifications are easily met by simply changing screens.

Compact design. *This is a "package" plant, specifically designed to give you maximum plant at minimum cost.* Plant needs space of only 15' x 180'. This lets you set up plant close to pit or water supply.

Semi-portable. All units can be quickly dismantled, moved, and assembled with a crane and transported by truck or semi.

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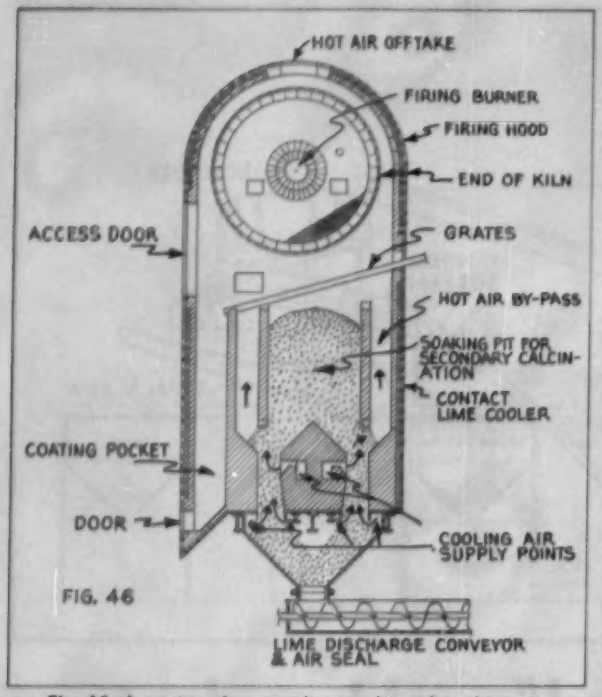

Fig. 46: A version of contact lime cooler with soaking pit

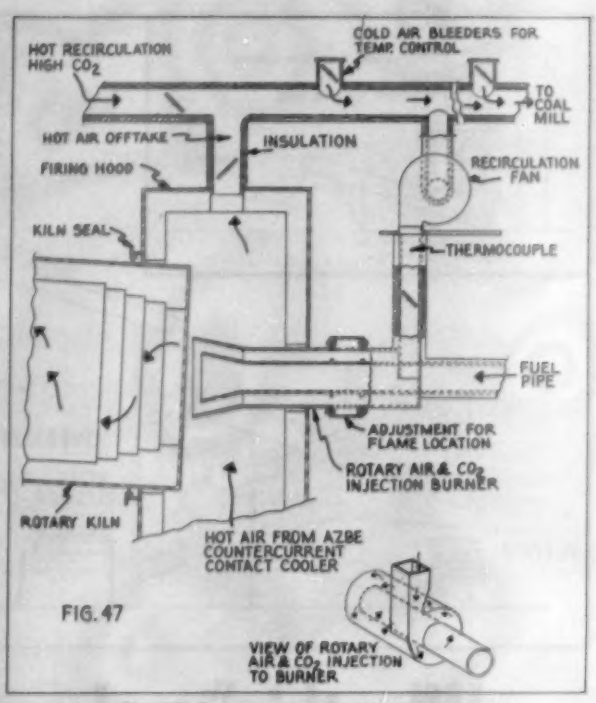

Fig. 47: Burner system for flame control

projection and angular distribution.

In the case of pulverized coal, hot recirculated gases are used in the mill rather than air from the hood or the cooler. The sensible heat of the lime, once transferred to the air is too valuable in the kiln to be wasted in the ordinarily uninsulated pipe lines, connecting the kiln with the mill. The arrangement is to obtain the recirculating gas hot and before its terminal cooling in the static stone preheater. The high CO_2 will also permit operation of the mill at a considerably higher temperature which is an advantage, particularly when the coal is wet.

The recirculating gas fan, as arranged, controls the burner; it may deliver either straight recirculating gas or be blended with hot air from the hood and cold air externally from the system.

The burner is a decided wide angle arrangement with the fuel introduced centrally, concentrically surrounded by the conditioning stream consisting of the recirculating gas and the desired small proportion of air. This escapes from the tip of the burner in a rolling flow of wide angle, filling out the cross section of the choked kiln opening. Into this active swirling stream, the hot air from the cooler is induced and equally distributed.

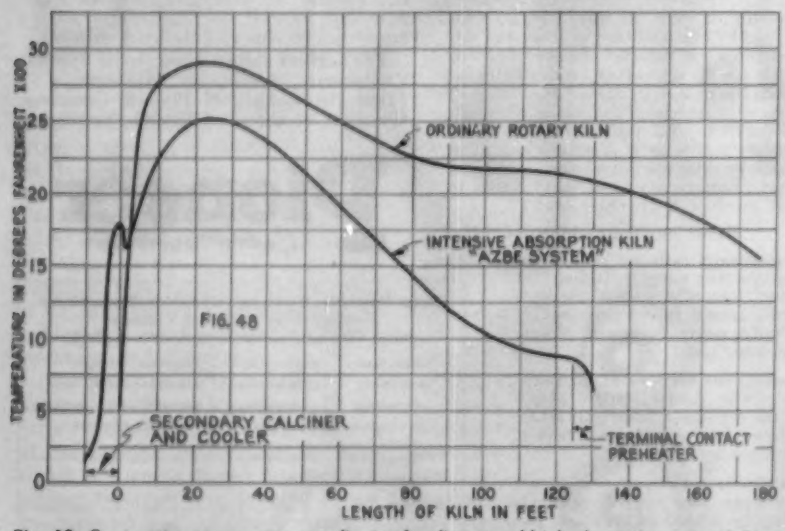

Fig. 48: Contrasting temperature gradients of ordinary and high absorption rotary kilns

Control over initial combustion temperature is obtained by either controlling the mixing of air and combustible, or controlling the CO_2 amount. Control over luminosity is obtained by creating conditions conducive to cracking of hydrocarbons; that is, creation of stratified flow and retarded access of air to the combustible gases. However, a kiln such as this is less dependent on high radiancy of flame, since it contains such an abundance of heat absorbing surface.

Such burner control would be desirable in all kilns, while ordinarily there is none; only a plain fuel admission pipe. Here it is essential to prevent excessive temperatures ahead of the quadrants and to assure uniform fuel-air proportional distribution within the open section of the kiln before the streams enter the quadrants.

Control is also desirable to build up the temperature in the open section as quickly as possible, but without exceeding 2500 deg. F., the point at which high temperature difficulties appear. The quick build up is desirable so that lime will cool as little as possible at the discharge of the rotary kiln and enter the finishing zone as hot as possible. At this point, conservation of sensible heat is very important for the sake of a greater amount of work being accomplished in the finishing zone.

Only a portion of the combustion process is completed in the open section, sufficient only to take care of the heat abstracted and to build the

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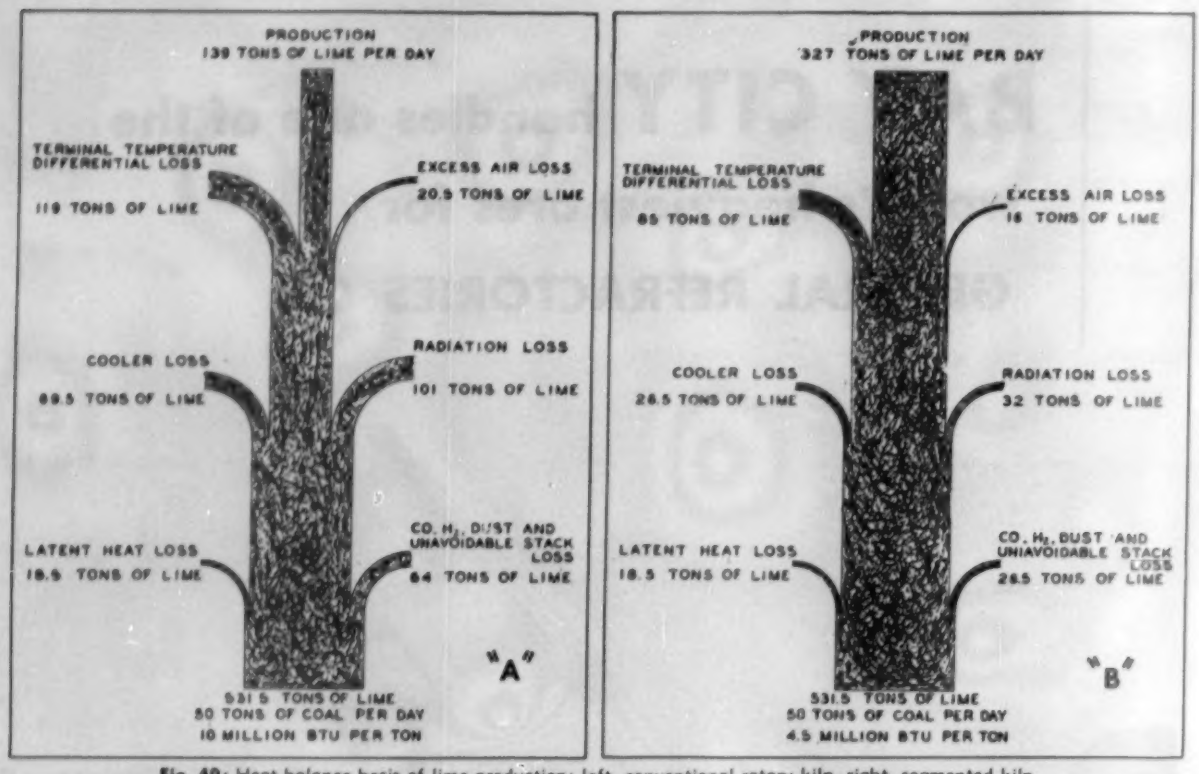


Fig. 49: Heat balance basis of lime production; left, conventional rotary kiln, right, segmented kiln

temperature to the desired point. The remainder takes place within the quadrants which, of course, is desired.

As mixtures are more intimate, gaseous stratifications much less, and turbulence far greater, combustion in such a quadrated kiln is completed considerably earlier than in an open kiln. This is all right since there is at least three times the heat transfer surface available, equal in actual effectiveness to from four to five times that of an open kiln.

In view of all this, a segmented rotary kiln lends itself better to forcing. There is hardly a limit to the forcing of a combustion apparatus as long as heat is abstracted at the rate it is generated.

In a rotary kiln of this type, combustion also tends to be more complete, even though the kiln is short. The condition commonly found in open rotary kilns, of separate streaks of high oxygen and in others of high combustible mixing, long delayed, or in part no mixing at all, is unlikely to occur.

Insulation

Commonly, rotary lime kilns have an uninsulated refractory wall, when newly lined, of 6-in. thickness. Due to the very high temperatures maintained inside, if this wall were insulated, it would not last long. Therefore, longer life is obtained at the expense of a very considerable heat loss.

It is necessary to appreciate the fact that only in the luminous section of the kiln is the heat transfer predominant from the gases directly to the material, otherwise more heat is received from the wall, but the uninsulated wall is an ineffective medium of transfer due to the high loss through the wall.

In this rationalized kiln, however, maximum temperatures are limited and any degree of insulation becomes permissible, thus making the outer wall a more effective heat transfer medium.

Temperature Gradient

Unless the stone is wet, even if the kiln operates at the relatively high thermal efficiency of 60 percent, the escaping gases leaving the static stone preheater will be between 600 deg. and 700 deg. F. and, of course, the entering gases considerably more.

Therefore, considerable preheating is accomplished in this unit, even though surface exposure is limited, because temperature difference between the entering stone and leaving gases is so high and contact so intimate.

In the open section of the kiln, preheating is much slower, but it is aided by the rotating flow of the gas stream and further aided by wall insulation which is more important in the non-luminous sections since here most of the heat is transferred through the medium of the wall.

After the stone enters the quadrants, its preheating is far more rapid. The cooling of the gases also is rapid, but the highest percentage of work accomplished does not take place until the now partially burned stone enters the section of the quadrant where combustion is still taking place and where heat transfer is by carbon radiation as well.

Radiation heat transfer is a matter of the fourth power of temperature difference, and in this rationalized kiln gas temperature is less, tending to lower radiation transfer. This is offset by the fact that surface is much greater, general temperature of the exposed surface lower, and the large gas stream being divided into four smaller streams, all tend to increase greatly the rate of such radiation transfer.

As the lime passes from the quadrant into the open section of the kiln, 80 percent of the heat transfer work has been completed; half, that is the easier portion of the remainder, is left for completion in the open section and the more difficult residual to the static finishing zone.

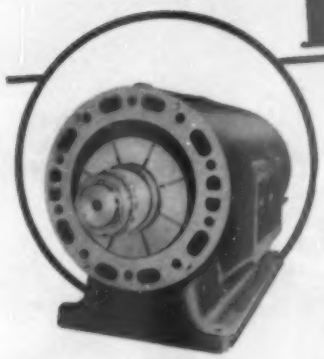
Fig. 48 presents contrasting kiln gas temperature gradients of an ordinary rotary kiln and of this intensive high heat absorption rotary kiln.

Draft Control

Air to the cooler is regulated in accordance with the lime drawn, and

(Continued on page 138)

Fuller pioneered



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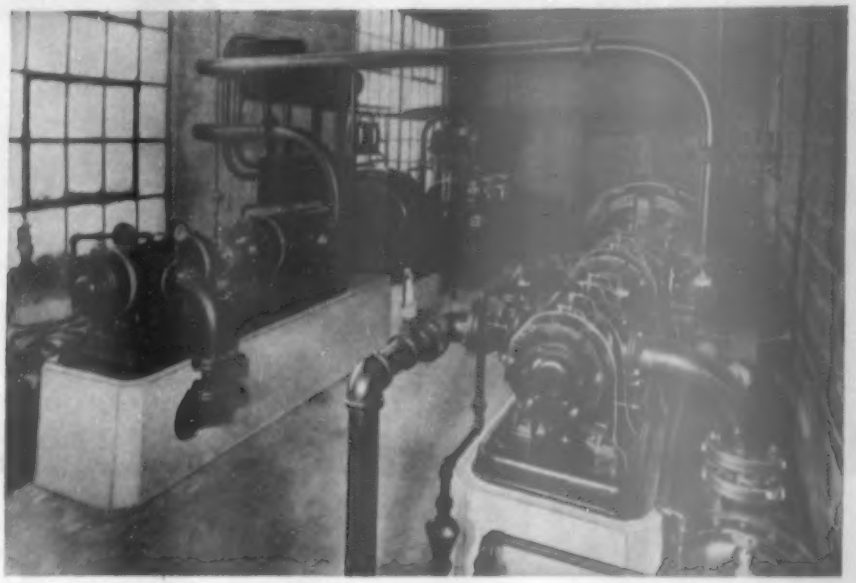

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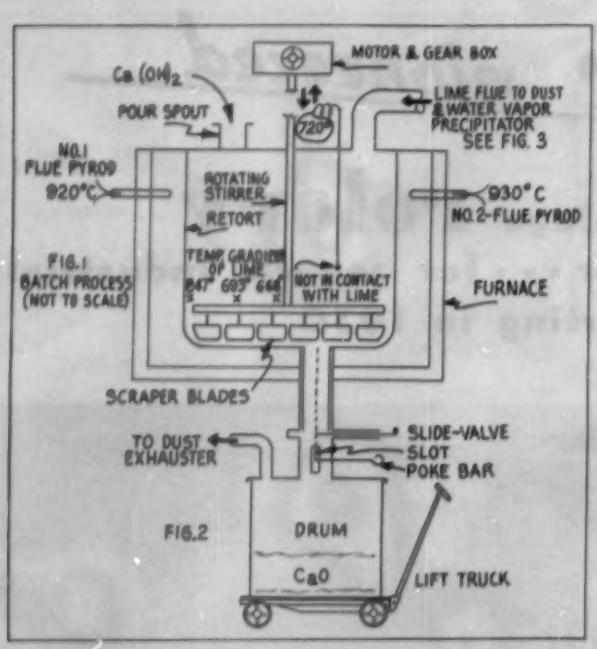

Fig. 1: Indirect-fired batch retort and furnace for calcination of lime. **Fig. 2,** below, shows the proposed covered discharge unit

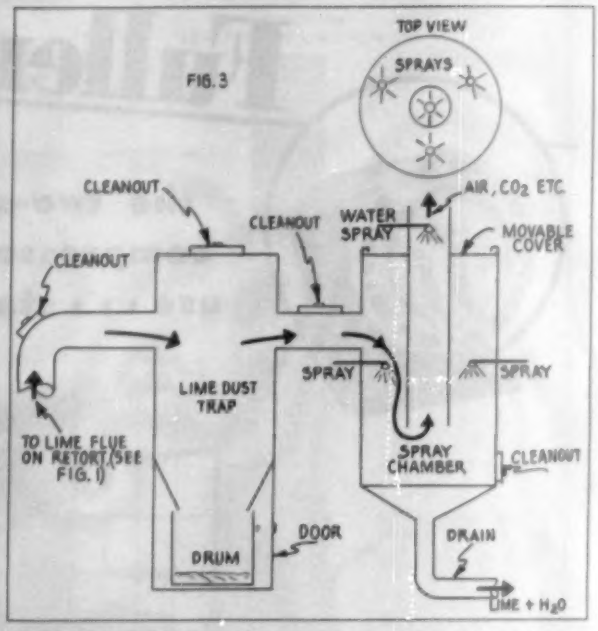

Fig. 3: Proposed dust and water vapor precipitator for calciner. Spray chamber serves to condense out water vapor, accelerate calcination and take out dust

Calcination of Lime By Indirect-Fired Batch Process

By FRANK GIBADLO*

READ ABOUT

. . . this unusual indirect-fired batch process for the commercial production of an especially pure calcined lime. Problems of entrained dust disposal in the products of decomposition, and the unloading of the hot lime with the attendant nuisances are described. Sketches show the equipment and graphs illustrate progress of calcination, and how they are used to control process. The method of furnace temperature control and the overall heat balance of the process is outlined.

SOME INDUSTRIES require high purity CaO in fine mesh sizes, particularly in certain chemical and metallurgical processes. Since most demands for such lime would be for relatively small quantities, the batch process is the most feasible as to original equipment investment and flexible operation. Generally, calcined chemical lime is produced by direct-fired rotary kilns. The raw product ($CaCO_3$), usually in lump form, is heated by direct contact with the flue gas containing CO_2, SO_2, oxides of nitrogen, etc. The latter tend to contaminate and produce undesirable characteristics in the lime. To obtain the proper type and quality lime here, it was mandatory to employ an indirect-fired retort. An indirect fired rotary kiln for this type of work necessitates large volume of product and a large initial investment, and also a certain amount of development work[1] would be necessary to iron out variables which would depend upon the type of raw material used and upon the desired characteristic of the final product.

By experience it was found that the optimum grade of calcined product, as desired here resulted from the dehydration of hydrated lime $Ca(OH)_2$, obtained from various selected sources. The hydrated lime (minus 100-mesh) had an ignition loss range of 23 to 25 percent—mostly water of hydration; 2 to 3 percent of this loss was CO_2, and had an apparent density of 0.59.

A typical screen analysis follows:

Mesh	Percent
-60 to 100	6.5
-100 to 200	75.0
-200 to 325	12.5
-325	6.0

The final calcined product showed an ignition loss ranging from 0.1 to 1.0 percent, the average—0.4 percent.

Retort Mechanism

In Fig. 1, is shown the batch type retort and the furnace, including the main auxiliaries. The retort is approximately 4 ft. in dia. and 4 ft. deep, within which rotates a stirrer having blades on one side which plow the product from the side of retort to the center. On the other side of the stirrer arm, the blades are placed in a reverse angle thereby plowing from the center to the side. This retort and stirrer is recommended to be composed of an alloy having approximately 65 percent Ni, 20 percent Cr for high-temperature corrosion resistance and also for maximum high temperature strength. It was found by experience that the use of a retort possessing less heat resisting qualities, warped the retort

(Continued on page 132)

*Mgr., Process Chemical Specialties, Beverly, Mass.

[1]Gibadlo, F., ROCK PRODUCTS, Vol. 52, September 1949.

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F-20

INFORMATION

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You can obtain catalogs listed on these pages by merely checking and mailing the coupon below

1 **AIR POLLUTION HAZARDS**—Industrial Hygiene Foundation of America, Inc., has reprinted a paper on "The Estimation of Health Hazards from Air Pollution" by W. C. L. Hemeon, engineering director of the Foundation. The reprint includes an hypothesis concerning identity of irritants in acute smog episodes. Tables and graphs are also included.

2 **AIR PRESSURE EQUIPMENT**—Ross Operating Valve Co. has brought out the first issue of a bi-monthly publication entitled "Ross engineAIR." It features application stories with engineering drawings; discussion of pneumatic fundamentals; and a digest of trade journal articles.

3 **BAGGING SCALE**—Richardson Scale Co. has announced Product Data Sheet No. 5001, describing the *FFFP* bagging scale, its operation and standard and operational discharge features. Also included are a dimensioned engineering drawing, and a listing of capacity, discharge rate, accuracy and scale components.

4 **BITUMIN RUBBERIZER**—Rubarite, Inc., has brought out a 16-page, illustrated brochure describing Rubarite, a rubberized material for use in asphalt and tar. Material characteristics are given, as well as test results, combining properties, construction results, and charts showing penetration, ductility, softening point, cold flow, etc.

5 **BLOCK MACHINE** — Oswalt Engineering Service Corp. has issued a bulletin describing and illustrating the No. 55 Model H concrete block machine. Machine parts are also described and illustrated.

6 **BUCKET CRANES** — Blaw-Knox Co. has announced Form 2510, illustrating and describing the relationship between the direction of bucket opening, and the location of material, and the position of the crane's holding and closing drums. Photographs and diagrams are used throughout.

7 **CEMENT AND RUBBER MIXTURES**—Natural Rubber Bureau has issued a review of the background of the mixture of latex and portland cements, entitled "Rubber Developments." Included are pointers on surface preparation, application of the cement latices with spray guns, use of latex-cement coating materials in prefabricated forms, etc.

8 **CONVEYOR BELTING** — Hewitt-Robins, Inc., has brought out a 23- x 33-in. wall chart on the proper selection and maintenance of conveyor belting. Also listed are types of belt recommended for various uses, and 12 practical maintenance tips.

9 **COUPLINGS**—C. B. Hunt & Son, Inc., has released Bulletin 551, describing and illustrating "Quick-As-Wink" valve and hose couplings. Included are dimensions, parts tables, and price list.

10 **CRUSHING-SCREENING PLANT** — Diamond Iron Works, Division of Goodman Manufacturing Co., has issued Bulletin D-5415, describing and illustrating the "77" portable crushing and screening plant. Specifications, on-the-job views, parts description, and a full-length side view of the plant, showing location of various units.

11 **DIESEL CRAWLER** — The Oliver Corp. has issued a 16-page booklet describing and illustrating the OC-12 diesel crawler. Specifications, optional equipment, parts descriptions, features and construction details are listed.

12 **DRILL BITS**—Hoffman Bros. Drilling Co. has released a general catalog covering its complete line of "Oriented Diamond" drill bits. The catalog lists sizes, setting charges, weights, uses, etc., for the standard bits. A section is also devoted to data on the Miniature Prospecting bits and to Laboratory bits for specialized use.

13 **DUST COLLECTORS**—American Air Filter Co., Inc. has brought out a bulletin entitled "Here Are the Answers to the Five Basic Dust Problems," describing and illustrating Roto-Clone, Amer-Clone, and Amer-Jet dust collectors.

14 **ELECTRICAL REVIEW** — Allis-Chalmers Manufacturing Co. has published its "Electrical Review" for the second quarter of 1955, containing data on Silco-Flex insulation for longer motor life; compressor selection and arrangement; drive selection; power distribution and control; how to increase step regulator ratings; and motor starting. Illustrations and tables are used throughout.

15 **EXCAVATOR**—Caterpillar Tractor Co. has issued *Form* 1605, describing and illustrating No. 933 or No. 955 Traxcavators. Model views of the units in action and cutouts of their features are included.

16 **FEEDERS AND BINS** — Diamond Iron Works, Division of Goodman Manufacturing Co., has announced Catalog D-101, describing and illustrating its line of feeders and bins. Dimension tables, line drawings, and typical application views are included.

17 **FELDSPAR FLOTATION**—Denver Equipment Co. has released the July-August issue (1955), of Deco Trafoil, discussing flotation of feldspar at Feldspar Corp. Data, photos and drawings illustrate the operation, and a flowsheet study of barite from low grade ores by flotation is given with each circuit phase discussed.

18 **FORK TRUCK** — Barrett-Cravens Co. has announced Bulletin 551-2, describing and illustrating the Model TTF-20 Hi-Lift walking type telescopic tilting fork truck. Specifications, dimensions and a turning radius table are included.

19 **FRONT PALLET RETURN** — The Kent Machine Co. has brought out a circular describing and illustrating the Kent automatic front pallet return, available as a feature on new KenTwin block machines, or readily attachable to units in the field.

20 HORIZONTAL STORAGE BINS — The Day Co. has issued Bulletin 549, describing horizontal storage bins designed for milling, feed and chemical plants, but may be adaptable to rock and concrete products plants faced with unusual head-room problems. Specifications and a view of interior construction are given.

21 INDUSTRIAL SAFETY LENS — United States Safety Service Co. has issued a brochure illustrating, in full color, "Style Ise" industrial safety glasses of Optilite "A," a special formula safety lens material.

22 INTER-PLANT COMMUNICATION — Mine Safety Appliances Co. has published Bulletin 1601-B, describing and illustrating the M-S-A Audio Safety System, an inter-plant or mine communications system. A schematic diagram of a typical installation is shown, along with accessories to meet various needs.

23 INSULATION FOR MOTOR WINDINGS —Allis-Chalmers Manufacturing Co. has released Bulletin 05R8341, entitled "Silco-Flex Insulation Opening the Way to Longer Motor Life." The "Silco-Flex" all-silicone-rubber insulating system for motor and generator stator windings is discussed, and its electrical, thermal and mechanical properties as well as chemical properties are explained.

24 JOINT AND DRIVE SHAFTS — Detroit Bevel Gear Co. has issued a brochure on Almetal universal joint and drive shafts, and discusses the advantages of needle bearing universal joints. Also described are replacement cross and bearing kits.

25 LEASING CRANES—Orton Crane & Shovel Co. has released a brochure entitled "Orton Craneleasing," describing the advantages of leasing cranes without capital investment, comparing the leasing plan with the company's time purchase plan, and giving examples of payment charts as well as re-leasing payments.

26 LIGHTWEIGHT PUMPS—Rice Pump & Machine Co. has announced Bulletin 55LW, giving the features of its lightweight, self-priming centrifugal pumps. A performance chart, sectional pump view, and specifications are also included.

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27 **LP-GAS FUEL SYSTEM** — Towmotor Corp. has announced a brochure detailing the performance of LP-Gas as used for fueling fork lift trucks. Schematic drawings and photo diagrams point out the operation and engineering of liquified petroleum-gas fuel systems.

28 **LUBRICATION**—The Texas Co. has published Vol. XLI, No. 6 of "Lubrication," featuring an article entitled "Petroleum Base Rust Preventives." Included are color photographs of tests with various type preventive coatings under various conditions.

29 **MAGNETIC PULLEYS**—Stearns Magnetic, Inc., has issued Bulletin 303-C, giving detailed specifications on its line of magnetic pulleys and pulley separators. Also included are a pulley selection method, operation principles, approximate weight of materials, a cross-sectional illustration, dimensions and weights, typical installation photographs and a list of applications.

30 **MINERALS PROCESSING**—Battelle Memorial Institute has prepared a 24-page booklet entitled "Research in Minerals Processing." The various steps of research are described and illustrated, and typical studies conducted by the Institute are listed.

31 **MONITOR**—North American Philips Co., Inc., Research & Control Instruments Div., has released a four-page folder giving data on the Norelco PW 4010 pocket battery monitor. Operation, sensitivity, tubes and batteries are covered. Details on accessories are also included.

32 **MORTAR CEMENT**—Universal Atlas Cement Co. has announced a 24-page booklet entitled "Build Better Masonry With Atlas Mortar Cement." It points out advantages of the material, illustrates quality control methods, and contains sections on recommended practice covering materials, proportioning, mixing, laying of units and reference tables of useful data.

33 **MOTOR SERIES**—U. S. Electrical Motors, Inc., has announced Bulletin 1879, describing and illustrating Types J and E totally-enclosed and explosion-proof motors. Photographs, cross-sectional views and drawings illustrate such features as the pre-wound stator core, asbestos-protected windings, and Lubriflush lubrication.

34 **OIL FILTERS**—Caterpillar Tractor Co. has issued Form DE583, entitled "Filter Research, How and Why . . .," giving the story behind the development of effective oil filters. The description starts at the company test stands, carrying through testing in engines in the laboratory and the field to final design.

35 **PALLET LIFT**—Stearns Magnetic, Inc. has released Bulletin 2510, describing and illustrating the "Pal-Lift" pallet lifting magnet. Specifications, dimensions, and features are listed.

36 **POOL WASHING SCREENS**—Allis-Chalmers Manufacturing Co. has released Bulletin 07B8214, covering "Pool Washing Screens" for handling a variety of materials. Diagrams illustrate screen operation.

37 **POWER SHOVEL** — Baldwin-Lima-Hamilton Corp., Construction Equipment Div., has announced Bulletin 204, covering its recently introduced ½-cu. yd. power shovel, 12- to 15-ton capacity crane, designated Lima Type 24 Jobmaster. Typical applications, including shovel, crane, dragline or pull shovel with crawler, wagon or truck mountings, are illustrated and described.

38 **PREFAB STEEL BUILDINGS**—The Steelcraft Manufacturing Co. has prepared a catalog picturing its line of standard prefabricated steel buildings. The structural steel system is illustrated, and the features highlighted.

39 **RECORDERS-CONTROLLERS**—The Bristol Co. has released a price list and specification bulletin, No. Q1305, on pH recorders and controllers for use with Beckman electrodes and amplifiers.

40 **ROLL CRUSHERS**—Diamond Iron Works, Division of Goodman Manufacturing Co., has published Catalog D-5413, describing and illustrating roll crushers with antifriction or plain bearings, chain or star gear drive. Included are dimensions, specifications, and applications.

41 **ROLLER BEARINGS**—Dodge Manufacturing Corp. has published a 52-page bulletin, No. A-638, giving technical information and list prices on the complete line of Dodge SC ball and Dodge-Timken roller bearings. Engineering drawings, dimensions, shaft sizes, weights and radial load ratings are given, as well as cutaway views and typical application photographs.

42 **RUST PROTECTIVE COATING** — Rust-Oleum Corp. has announced a 10-page report prepared by Battelle Memorial Institute technologists, on the "Development of a Method to Determine the Degree of Penetration of a Rust-Oleum Fish-Oil-Based Protective Coating Into Rust on Steel Specimens." Included are detailed discussion and results, and experimental details.

43 **SAFETY SERVICES GUIDE** — National Safety Council has published its 1955 Occupational Safety Services Guide, No. 2.1, a 68-page book giving a list of Council periodicals, newsletters and a complete library of technical and administrative publications covering all phases of occupational accident prevention. A full line of safety posters, films and booklets are also listed.

44 **SCRAPERS**—Sauerman Bros., Inc., has announced its periodical magazine, "Sauerman News," which contains, among other articles, a list of field reports available on a variety of scraper installations, including sand and gravel.

45 **STEEL STRAPPING MACHINES** — Gerrard Steel Strapping Division, United States Steel Corp., has brought out a brochure describing and illustrating the Model "Q" semi-automatic round steel strapping machine. Various uses of the machine are illustrated, ranging from the strapping of corrugated cartons and dimension stock to newspaper and welding rods.

46 **TAPE-FORM PROTECTIVE COATING**—Tapecoat Co. has announced a brochure describing Tapecoat-X, a coal tar coating in tape form for protection of pipe, pipe joints, fittings and couplings. A table of coverage shows the advantages of the product, and illustrations point out application methods.

47 **THIN WALL CONSTRUCTION**—Zonolite Co. has released Booklet CA-18, discussing the use of thin wall sections to cut construction costs and to increase usable floor space of buildings. Results are given of an Underwriters' Laboratories fire test, and applications are suggested.

48 **TUNGSTEN CARBIDE HARDSURFACING**—Coast Metals, Inc., has prepared a folder describing its tungsten carbide hardsurfacing weld rods. Methods of application, sizes, and welding recommendations are included.

49 **VARIABLE SPEED PULLEY**—Equipment Engineering Co. has prepared a four-page brochure listing product advantages, operating principles, installation procedures and specifications of the Hi-Ratio variable speed pulley. Illustrations, diagrams and typical installation photographs are included.

50 **VIBRATING SCREEN**—The Dalstar Concentrator Co. has announced Bulletin 16-EH, covering the Model E FlexElex equipped Leahy vibrating screen. Features, descriptions, types and sizes are given.

51 **WATER PERCENTAGE CONTROL** — Minneapolis-Honeywell Regulator Co., Industrial Div., has published Data Sheet No. 1.1-4, describing control of water percentage in wet process cement manufacture by means of the Bendix Nuclear Density Gage equipped with an ElectroniK controller. Advantages, method of operation, design features, performance specifications and instrumentation are given.

52 **WIRE ROPE** — Macwhyte Co. has published Ropeology No. 5535, containing data on combination cable-tool and rotary well drilling machines, helicopter hoisting, and transporting 4000-lb. equipment, wire rope storage, a clay mine and dam project using wire rope, and a plastic coated cable.

53 **WORM GEAR DRIVES** — The Cleveland Worm & Gear Co. has issued a brochure entitled "Always on the Job," describing worm gear drive applications in various industries. Typical on-the-job photographs are given.

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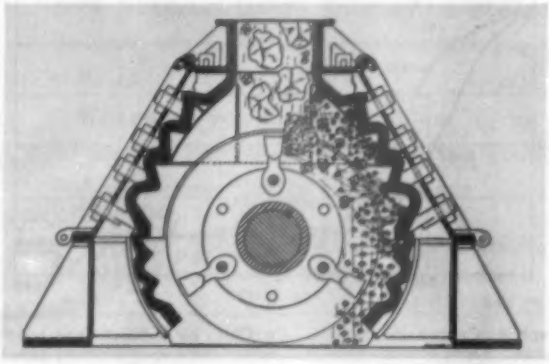

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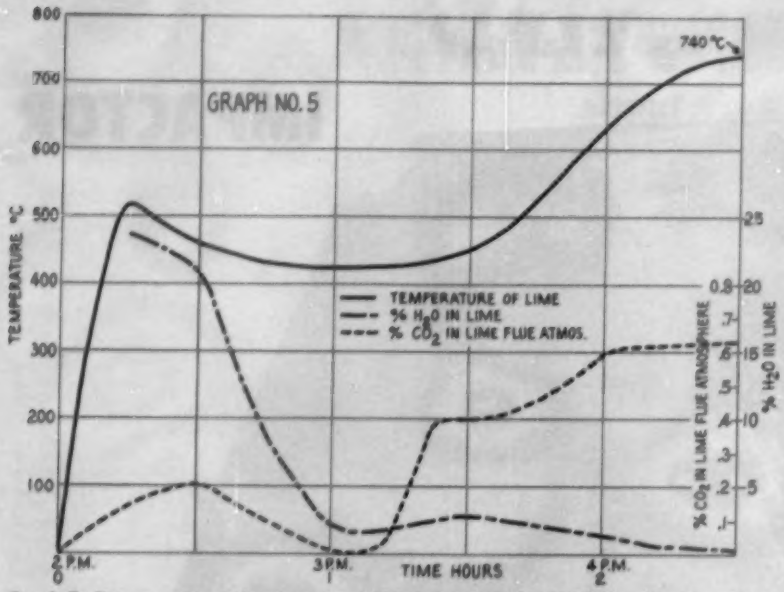


Graph 5: Decomposition of carbonates during calcination of $Ca(OH)_2$. (Percent CO_2 in lime-flue conjugated with lime temperature; also shown in relation to time)

BATCH PROCESS

(Continued from page 126)

so badly that the stirrer bound tightly against it. Also in a short time holes were melted in the sides of the retort. In the top section is shown a speed controlling and reversing gear box which is connected to the stirrer's vertical shafts by a modified universal coupling arrangement. The hand wheel on the gear box adjusts the vertical height of the stirrer.

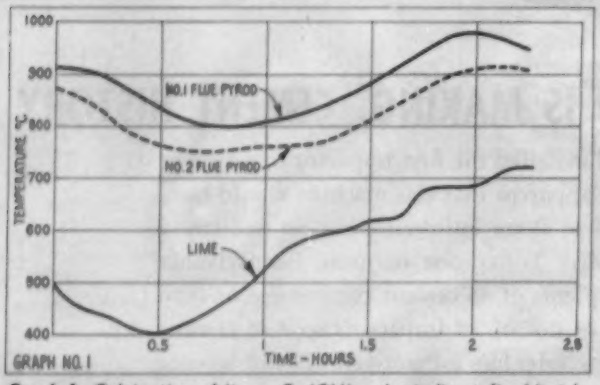
Hydrated lime is introduced through the spout on top of the retort cover. This is done with the stirrer rotating; otherwise a large pile of cold lime in one spot tends to cause a localized thermal differential or strain upon the hot retort, thereby eventually resulting in metal cracking.

Fig. 1 also shows the temperature gradient of lime from the center shaft to the wall of the retort; the flue and the average lime temperature were obtained by permanent indicating pyrometers.

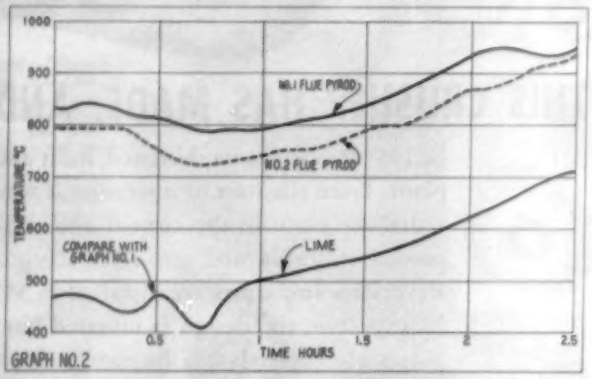
The temperature of the lime is brought up to at least 725 deg. C. This insures a dehydrated product and, for this particular purpose, the proper density. Since some investigators give 580 deg. C. as the decomposition temperature of $Ca(OH)_2$, the coolest area at the center is well over this temperature. The length of the calcination cycle is generally from 2 to 2½ hr. Higher temperatures and increased duration of calcining cycles have been found to produce a "hard burnt" and less reactive product.

Decomposition Reaction

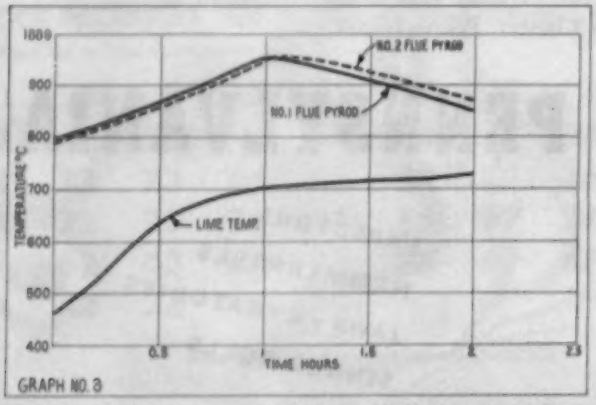
The decomposition of lime is an endothermic reaction, and when initiated, rapidly absorbs and transfers the



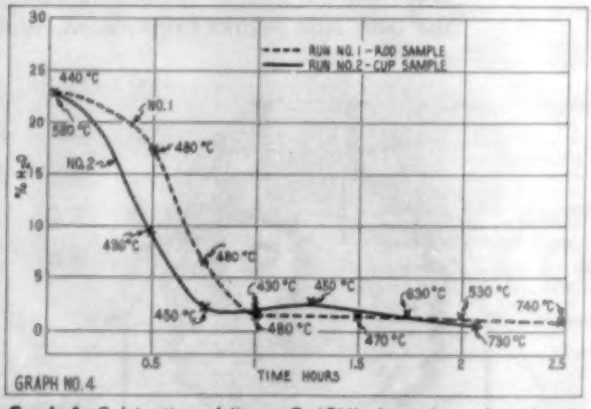
Graph 1: Calcination of lime—$Ca(OH)_2$—by indirect-fired batch process. (Temperature of lime and flue vs. time)



Graph 2: Calcination of lime—$Ca(OH)_2$ by indirect-fired batch process, showing effect of plugged lime flue on lime temperature



Graph 3: Reclamation of calcined lime (CaO) by indirect-fired batch process. (Temperature of lime and flue vs. time)



Graph 4: Calcination of lime—$Ca(OH)_2$ by indirect-fired batch process. (Spot temperatures and water content of lime vs. time)

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TORQUE-ARM SPEED REDUCERS

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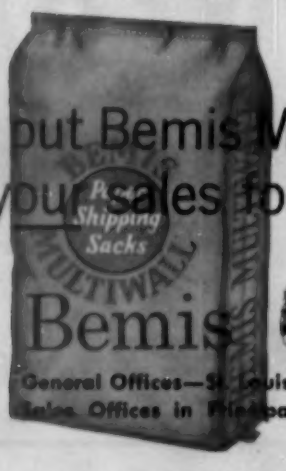

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sensible heat of the lime itself and also of the retort into latent heat, causing a sharp drop in the temperature of the lime and the flue gas. The rate at which this temperature drops and the point to which it descends, depends somewhat upon the type of hydrated lime used and its degree of hydration. The temperature drop is also affected by the efficiency of the lime flue draft, and also by the degree of mixing and agitation, which in turn affects the removal of water vapor from the surface of the particles.

The lime temperature, Graph 1, progressively reaches a low point and then gradually proceeds upward without any dips; this is considered an optimum condition. In Graph 2, the lime temperature alternately goes down and up twice. This condition has been due to the lime adhering to the stirrer in one large mass and/or to plugged lime flues. Normal efficient operation has resulted by alternately reversing the rotation of the stirrer several times, and also cleaning the line flues.

In comparison, Graph 3 shows the temperature curve of a batch of previously calcined lime (ignition loss 4 percent) being recalcined. It is noticeable that practically all of the heat is sensible and goes into raising the temperature of the lime.

Flue Dust

During the calcining period, the water being driven off as vapor entrains a copious amount of lime dust which presents a major handling and disposal problem. The dust is irritating to the eyes and nose, and provisions must be made to minimize this nuisance in the work area and neighborhood. Much experimental and development work on various methods of dust control was carried out. In the sketch, Fig. 3 is shown a dust collector which performed fairly well, however, further development work was being carried on to improve the performance. It was found that provisions should be made for sufficient cleanout openings to enable long bars to push away hot settled lime dust which has an affinity to stick and clog. These bars are used once or twice during a run. The water sprays in the spray chamber serve in a triple capacity; to condense out water vapor, which in turn creates a partial vacuum thereby accelerating the calcination, and also the sprays knock out dust. In Graph 4 is shown the relationship of water content of lime versus time or duration of calcination with indicated spot temperatures. The accelerated decomposition of the small quantity of carbonate to CO_2 in the products of decomposition increases with an increase of lime tem-

(Continued on page 142)

SUPER-TEMPERED
PRECISION SPACE SCREENS

assure greater tonnage output at a lower cost

To the casual observer, one space screen is pretty much like another. But, in terms of downtime, output and screen life, basic differences are readily apparent. That is why Super-Tempered Space Screens have long been standard on difficult jobs where costs are a determining factor.

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CF&I

GRINDING MEDIA
Studies Result In Reduced Costs

• Santa Cruz Portland Cement Co., Davenport, Calif., has made a continuous study of grinding media to reduce costs to a minimum and increase efficiency

WAYS TO REDUCE COST are constantly being sought by the Santa Cruz Portland Cement Co. in common with all others. As an example, this company has been making a continuous study of grinding media.

Clinker grinding uses a lot of power and consumes a large quantity of steel balls. When bought, the balls cost over $200 a ton, and even when misshapen and discarded are worth more than cement. The most expensive ingredient in cement is the ground up balls, so it is most important to see that they wear out as slowly as possible.

It is always a problem to balance grinding efficiency, ball wear, down time, and ball cost in evaluating the relative desirability of the various balls on the market. There is the other factor of shape of grinding media when balls are not used. This last variable was eliminated by this company about 20 years ago when various reasons, not all necessarily connected with the grinding media, resulted in the use of balls exclusively as the active grinding element.

Since that time experiments have been made with cast, roll forged and alloy balls. The cast iron balls were eliminated rather quickly, and for a long time only the common forged ball was used.

In the late thirties some rather high alloy one-inch balls were purchased for use in 5½- x 22-ft. tube mills. The trial ended in disaster when the balls started to split and come out of the mill with the cement. They caught under the screw flights jamming the screw and forcing the company to put small rotary screens in the exit trunnions. The scrap caught amounted to about 100 lb. a day from a charge of 11 tons. This was too much so no more balls of that composition were purchased.

In the late forties, a mill was loaded completely with an alloy ball, said to be like armor plate, of different manufacture. They started to split requiring the mill to be shut down at least once a week to burn the scrap out of the mill screens so that production could be maintained. After a short while the mill was dumped, the balls discarded and the mill reloaded with a normal carbon steel ball.

Some years later when the company was approached with the idea of using Ni-hard balls, officials were very sceptical. The manufacturers story sounded too good to be true, but a load for one mill was finally purchased with enough for normal make-up.

To be sure of the wear rate, two mills 5½- x 22-ft. were dumped, liners checked, and loaded, one with the Ni-hard balls and one with roll forged carbon steel balls. All the balls were 1 in. in diameter. The ball depth was measured. Once each month the mills were opened, ball depth determined and enough balls added to bring the load up to normal. The mills were operated under similar conditions of feed, load, speed, mill liners, etc. After some months the mills were dumped, the balls screened and weighed with the following results:

Mill	Charge	Hr. Run	Ball Loss	Bbl.	Lb./bbl.
8	Steel	13353	40200 lb.	284600	.14
9	Ni-hard	14170	12450 lb.	297500	.041

The ball loss included that lost with the cement and all of the balls that would pass through a ½-in. screen.

With those results, all of the roll forged carbon steel balls were replaced in the tube mills with Ni-hard balls. Enough balls have been purchased from Pacific Ball Mfg. Co. to completely load five more tube mills. The results have been uniformly good.

After the use of Ni-hard balls was started, one of the mills was relined with Allis-Lorain liners and lifter bars. This lining has a much more effective lifting action on the balls and should have increased the ball wear. After 7246 hr. and 158,000 bbl. of cement, the mill was shut down to replace one set of lifters at the feed end of the mill. This opportunity was taken to screen and weigh the balls. In this mill and for this length of time, the ball wear was .03 lb. per bbl.

It is now planned to use only Ni-hard balls in tube mills. Experiments are being conducted with 1½-in. Ni-hard balls in one of the larger mills, but with only a preliminary good report. So far no adverse effects from the use of the Ni-hard balls have been observed.

New Gypsum Products Plant

KAISER GYPSUM CO., Oakland, Calif., will build a second gypsum products plant at Pittsburgh, Calif., to replace its Redwood City plant recently destroyed by fire. The company expects to bring the new plant into production by December. It will have an annual capacity of 94,000,000 sq. ft. of gypsum board products.

The plant will be adjacent to a larger, $5,000,000 gypsum products plant previously announced and due for completion next summer. The two plants will have a combined annual capacity of 274,000,000 sq. ft. of gypsum board products and 20,000 tons of plaster.

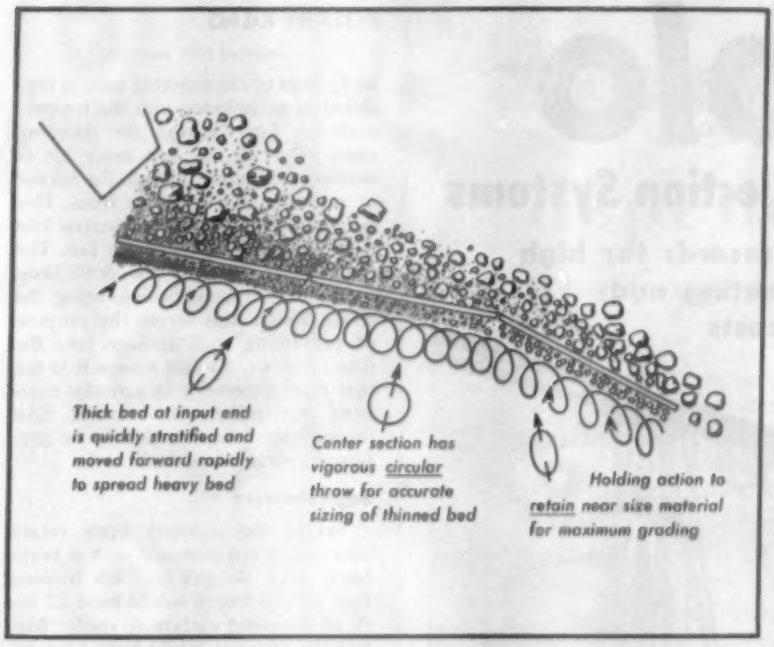
The company is not rebuilding the Redwood City plant, because it has a non-renewable lease on the land with less than four years to go, and the cost of reconstruction there would not be justified.

Celebrates 75th Anniversary

SAN ANTONIO PORTLAND CEMENT CO., San Antonio, Texas, has published a colorful brochure marking its 75th anniversary. The booklet traces the growth of the firm from 1880 when its first grinding mill produced 10 bbl. daily to the present, when its largest mill grinds about 2750 bbl. daily. Current annual production is 2,000,000 bbl. Charles Baumberger, Jr., president of the company, succeeded his father who had joined the organization in 1883 and served as president from 1897 to 1948, the year he died. The company has 300 employes.

Moves Office

THE PERLITE INSTITUTE has moved its office from 10 East 40th St., New York 16, N. Y., to a larger office at 45 West 45th St., New York 36, N. Y.


Thick bed at input end is quickly stratified and moved forward rapidly to spread heavy bed
Center section has vigorous circular throw for accurate sizing of thinned bed
Holding action to retain near size material for maximum grading

End tension, featuring the longitudinally curved screen surface in combination with the opposed elliptical throw of the Unitized Lifetime Vibrating Mechanism, available in 1 to 4 decks, from 2½' x 4' to 5' x 10'.

Side tension screen featuring adjustable slope panels. Divided screening sections, identical in size, permit shifting to distribute wear. 1, 2 or 3 decks in sizes up to 6' x 16'.

How to select sizing equipment

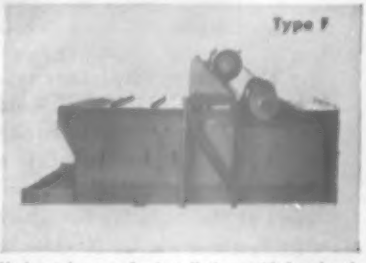
Most aggregates producers are caught in a three-way squeeze . . . rising production costs . . . more rigid specifications . . . and stiffer competition. It takes the best in screening equipment to meet this challenge . . . big capacity, cost cutting, hard working screens . . . in a size and model selected to do your particular job best. Several leading manufacturers can claim these advantages. But, before you invest, investigate the screen that has all these . . . and many *exclusive* features in addition that make it stand out from all the rest.

Deister's exclusive "Opposed Elliptical Throw," for example, accurately controls the movement of material on the screen for greatest speed and efficiency in sizing . . . provides more capacity per square foot.

And, don't overlook Deister's exclusive "Unitized Lifetime Vibrating Mechanism." It's a precision-constructed, jig-assembled unit . . . demountable and readily interchangeable. Mounted well above heat, grit and dirt, it features renewable sleeves to prevent wear on bearing housings and shafts, and it operates in a bath of oil.

Among others, remember that Deister screens are backed by a follow-through parts and service policy without equal, for Deister top management is personally interested in the continued, profitable operation of every Deister screen in the field.

Ag-lime screen . . . handles fine, damp materials at high capacity without blinding because of much longer stroke, higher speed and with graduated stroke feature.



Horizontal screen for installations with low headroom. Features the Deister drop-deck, providing greater screening area for the critical sizes.

DEISTER MACHINE COMPANY

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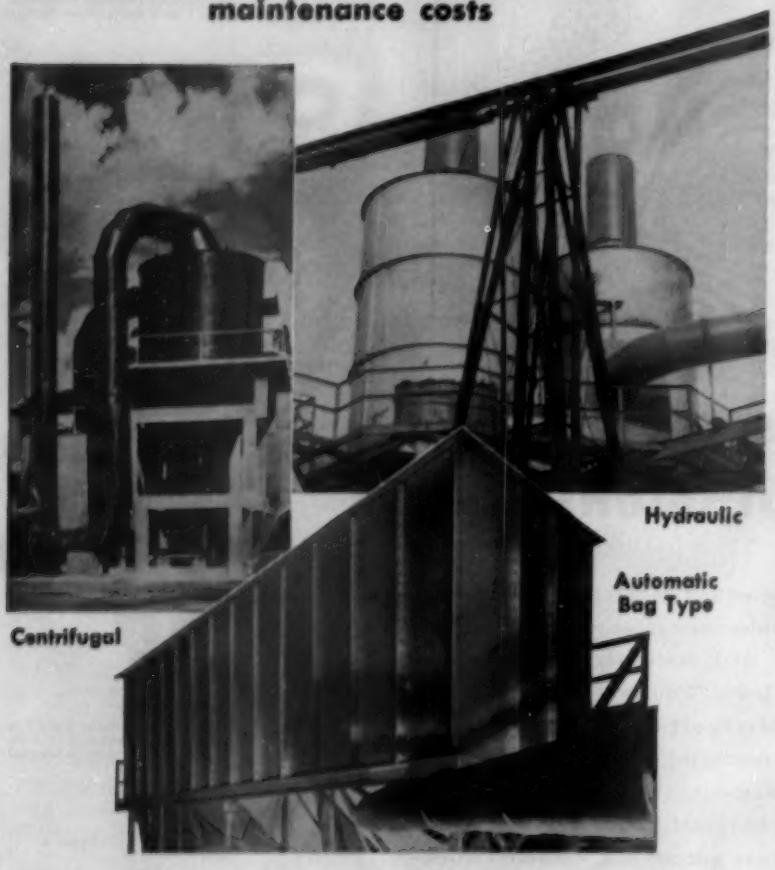

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These three important types of Norblo collecting systems, frequently used in certain combinations, bring you economical, dependable control as required in a wide range of industries. "Guaranteed Efficiency" is not an empty phrase at Norblo. We stand back of every installation that's used for the purpose and at the capacity for which we designed it. All component parts are made by Norblo, under controlled specifications.

For more than 40 years Norblo has engineered and supplied installations of every size in the rock products, smelting, chemical, metal working, milling and processing fields. It pays you to get the facts about Norblo Dust and Fume Collecting Systems. Give us a description of your problems.

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Engineered Dust Collection Systems for All Industries

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ROTARY KILNS

(Continued from page 124)

air by-pass of the finishing zone is regulated in accordance with the temperature of lime leaving the finishing zone. However, as still more air is necessary, it enters through the burner or as tramp air at the kiln front. This latter air is induced by the general kiln draft created by the exhaust fan. The draft is regulated by the draft drop across the terminal orifice, being the choke which also serves the purpose of preventing rock spillage into the dust chamber. By this means it is not that draft constancy is actually regulated but rather the rate of flow through the kiln; a much to be preferred system of control.

Segmentation

Taking the ordinary open rotary kiln of a given size and with a fairly heavy load, the gas for each running foot of kiln length would have 22 sq. ft. of projected surface to confer heat and the material would have 14½ sq. ft. to receive the heat.

In the case of the segmented or quadrated kiln of the same size, gas exposure would be 47 sq. ft. or more than double, and material exposure 37 sq. ft., almost three times the open kiln figure. The excess of material exposure to gas exposure is also an advantage.

In the case of an open kiln, the wall receiving and giving up heat would be only partially effective, due to losses through the wall. The quadrant walls are not so exposed and any heat imparted to them is utilized. For a portion of the kiln revolution, while heat is being absorbed on one side, the other is being heated. Therefore, not only is the surface greater, its effectiveness also is greater.

The quadrants increase the kiln load and therefore the kiln time which is an advantage. In addition they tend to bring all of the stone to the surface, the fines appearing three times in every revolution, while in the case of the open kiln they never appear, as shown by the various illustrations.

This means of dividing a rotary section into segments is regularly employed in coolers as well as in kilns but their value in the hot zone and their exact position have never been revealed before. However, valuable as they may be in the preheating of stone, their possible worth is far greater to the calcination process itself.

By rationalization is meant not only insertion of quadrants but their proper location and satisfaction of the other requirements, including recuperative cooling, secondary calcination, combustion and temperature elevation con-

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trol, kiln size relationship, insulation, preheating of stone and many other factors incidental thereto.

What all this does accomplish is portrayed by Fig. 49 featuring the heat balance in terms of "lime produced" and "lime lost" for the ordinary ten million B.t.u. kiln, and also for such a rationalized unit. The contrast is startling indeed. Results unbelievable, but theoretically sound and practically possible.

"POWERAMA"

(Continued from page 70)

formed by the twin crawler tractors. Euclid also exhibited one of its 50-ton end dump trucks — the largest ever built — which was converted to a swimming pool, complete with diving board and bathing beauties.

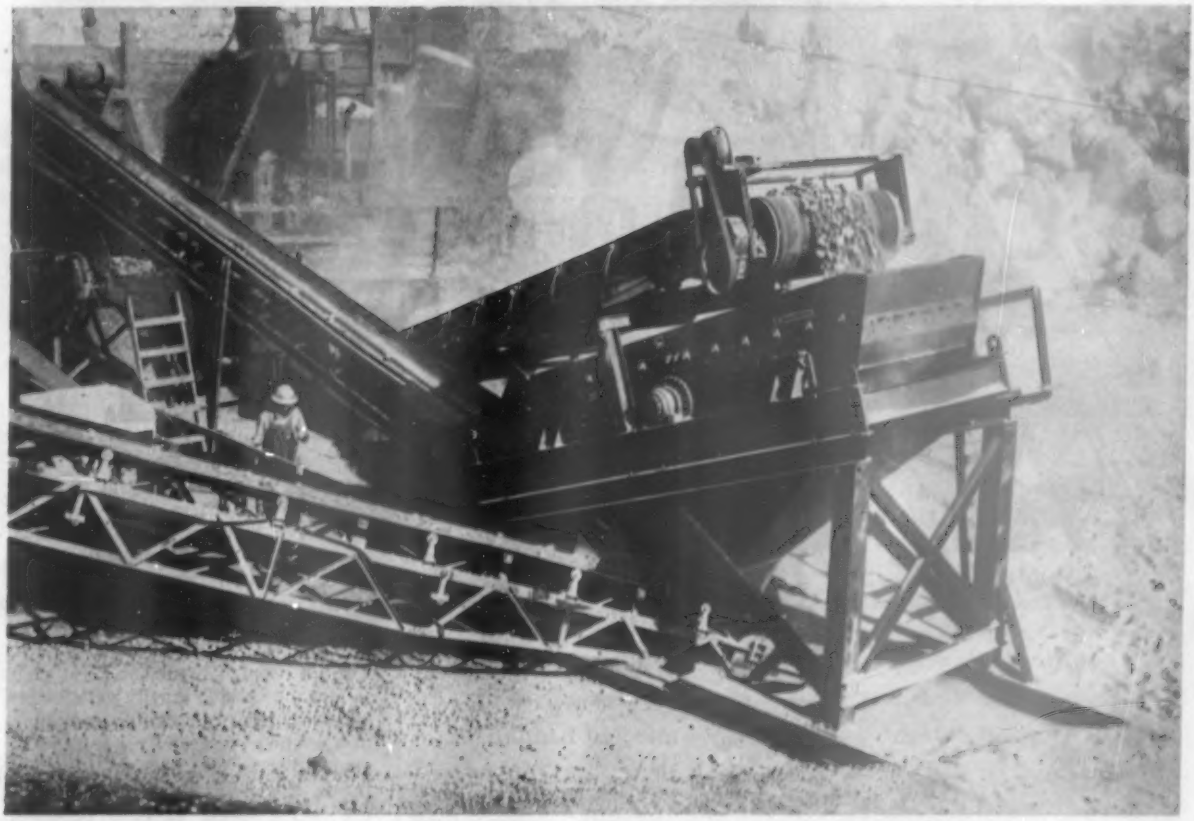
At two spectator demonstration exhibits sponsored by the Allison Division, advantages of hydraulic torque converters were shown. In one exhibit visitors operated a Link-Belt crane equipped with an Allison Torqmatic converter; first an 8000-lb. dropball was maneuvered using the friction clutch method and then with the torque converter. The latter method gave finger-tip control. The other exhibit involved a 50-ton Euclid truck cab display, in which spectators were able to simulate driving out of a 300 ft. deep Mesabi iron ore pit, using first mechanical transmission and then with an Allison Torqmatic converter and transmission. The converter-equipped truck demonstrated quicker and smoother acceleration without the usual engine lugging, shifting lags, and momentum losses.

Other General Motors divisions participating in Powerama included Buick, Cleveland Diesel, Diesel Equipment, Electro-Motive, Fabricast, Frigidaire, G.M.C. Truck & Coach, and Research Laboratories.

Portland Cement Folder

MEDUSA PORTLAND CEMENT CO., Cleveland, Ohio, has published an unusual eight-page, gate-fold folder, describing the manufacture and uses of portland cement. Included is a plant flow sheet, accompanied by photographs and a detailed description of all processing departments. An interesting highlight is a map of the proposed national system of interstate highways which will increase the nation's requirement for cement by an estimated 50,000,000 bbl. In addition, uses of portland cement by classes of construction are listed. A copy of this folder can be obtained by writing for "The Manufacture and Uses of Portland Cement," Dept. M., Medusa Portland Cement Co., 1000 Midland Building, Cleveland 15, Ohio.

SIMPLICITY 5′ x 12′ SCREEN
SPEEDS CONTRACT COMPLETION FOR FREEWAY CONTRACTOR



Simplicity Model D 5′ x 12′ two-deck screen receiving volcanic rock from crusher.

BALDWIN CONTRACTING CO., INC., Marysville, California, utilizes this Simplicity Model "D" 5′ x 12′ two-deck Screen for sizing 2" material for highway base. Since April 14th 75,000 tons of tough, volcanic material have been handled by this Simplicity Screen. Operators all over the country are counting on Simplicity Screens where large-scale production of low-cost material is required. Simplicity units will increase production and will insure fast, accurate sizing in your Plant. The Simplicity simplified balanced assembly helps keep maintenance costs down. For complete information, consult a Simplicity sales engineer or write us today.

For further information on Os-A-Veyor Feeders, Conveyors, Gyrating Screens and Woven Wire Screen Cloth, write . . .

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BATCH PROCESS

(Continued from page 134)

perature as shown in Graph 5.

After the calcining run is completed, the dehydrated lime is emptied by gravity through the bottom spout, approximately 2 ft. long and 5 in. in dia., into a steel container or drum. The lime is channeled into the bottom spout by slowly rotating the stirrer. This removal procedure created a large amount of disagreeable hot dust. To minimize this dust, considerable experimental and development work was carried on. Fig. 2 shows the latest unloading set-up with the most promise.

Each run of calcined lime was analyzed for ignition loss — generally running below 1 percent. For every pound of raw lime calcined, three-quarters of a pound is theoretically produced. $Ca(OH)_2 \xrightarrow{-\Delta} CaO + H_2O$. The average production yield here was 70 percent or an efficiency of 93 percent, 7 percent loss, mostly as dust. Approximately one-half (3½ percent) of the latter was recovered from the dust trap.

The furnace was heated by four large gas burners; two of these burners were capable of being hand controlled, but were set permanently at approximately three-quarters of capacity, the other two burners were controlled automatically by a pyrometer. The peak or shut-off temperature was set at 960 deg. C. The air pressure supplying the gas burners was 5½ in. w.g. on high, and 1 in. w.g. on low fire. The gas supply situation was not ideal in that the specific gravity varied continuously from .42 to .65, consisting of a mixture of various proportions of coal and water gas. This in turn varied the air-gas ratio of the burners, making it impossible to have optimum combustion performance at all times. However, satisfactory overall performance and results were obtained.

Heat Balance

1 lb. $Ca(OH)_2$ requires 650 B.t.u. for decomposition (water from reaction uncondensed).

Decomposition of lime $Ca(OH)_2$	19.6 percent
Sensible heat of lime	8.7 percent
Flue gas	27.0 percent
Radiation and other losses	44.7 percent
	100.0

Gas cost per lb. of calcined lime is approximately 0.7¢ based on the rate of 6½¢ per 100 cu. ft. The large losses indicate the need of a furnace with thicker insulated walls; in addition, the retort cover should be insulated.

The decomposition of lime (see following equation), is given as 580 deg. C. 760 mm. water vapor pressure; at

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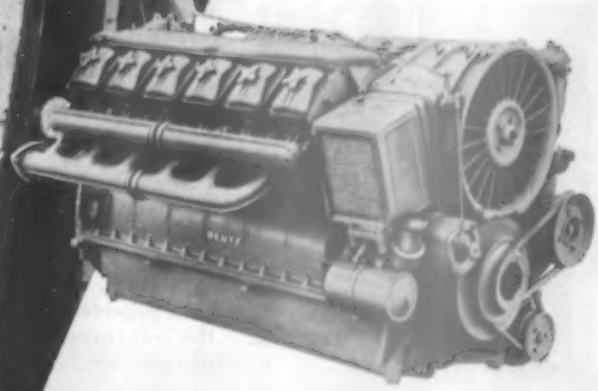

Improved, high-efficiency air cooled Diesels without liquid cooling systems, that run non-stop in temperatures up to 140°, or down to —40°, simpler in design for quicker inspection or maintenance when necessary, and in models for portable, mobile, or stationary service — they are reasons why the quarry industry is turning fast to DEUTZ Diesels.

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Dust hood at one of the ball mills.

Dust hood leading from 24" screw conveyor.

Cleanliness pays off in this Lone Star Cement Corporation plant where Sly Dust Filters give an *all star* performance, 24 hours a day, day after day.

These filters collect dust at critical points — save cement — effect operating economies — assure a cleaner plant. For Sly Dust Filters are designed and built with an abundance of cloth for greater filtering capacity and a 100% filtering job.

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If you have a dust problem, let's talk it over. Ask for Bulletin 98 — full of helpful information on controlling dust, *economically.*

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350 deg. C. the vapor pressure of water is 100 mm.[2] This indicates that the decomposition of lime may proceed at lower temperatures under reduced ambient water vapor pressure.

Equation $Ca(OH)_2 \xrightarrow[350\ deg.\ C.\ 100\ mm.]{580\ deg.\ C.\ 760\ mm.} CaO\ H_2O$

[2]Partington, Textbook of Inorganic Chemistry, 1933, p. 820.

ROCKY'S NOTES

(Continued from page 49)

durable concrete. Both were built of sand-cement (approximately 50 percent portland cement and 50 percent ground or pulverized silica). The cement as purchased was reground at the damsite with the silica. Various explanations have been proposed for this particularly good concrete (exceptionally good, we might add), and the one most usually accepted seems to be that the regrinding of the cement is what did the trick.

However, Mr. Coghlan, who was on the job, apparently had other ideas. He attributed the good qualities of the cement to the pozzolanic activity of the pulverized silica. Apparently there were no chemical tests of the cement, or of the pulverized silica which give any clues to the amount of alkalies present, but Mr. Coghlan did conclude from his tests "that the materials which develop the most [pozzolanic] activity with hydrated lime are those containing the oxides of sodium and potassium in an available form."

To test his conclusion Mr. Coghlan tried a pulverized sandstone that did not show sodium and potassium oxides in available form, because these elements were combined as sulphates and chlorides; there was no pozzolanic reaction; but pozzolanic reaction was readily developed by adding a small percentage of sodium silicate. A search of the literature will show that nearly all the good pozzolans used by the ancients were relatively high in alkalies; also, in the early American natural cements. Some of these showed and still show remarkable properties of durability (the Rosendale cements) and they are high in alkalies and magnesia too.

Conclusions

If the object of portland cement as a binder is to make silica gel in situ, and subsequently or simultaneously combine it with lime, or as Powers and Steinour suggest, with a complex of lime and alkali, there can be no question that addition of sodium hydroxide, or sodium silicate, can be made to prove helpful. Also, any geologist can prove that silicate rocks (the feldspars which form the bulk of gran-

(Continued on page 146)

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ites, traprocks, etc.) are more durable as one goes from the high calcium end of the plagioclase series to the high alkali end. Therefore, why shouldn't alkalies improve the properties of portland cement if properly used?

The question naturally arises why haven't alkalies been purposely added to or retained in portland cement clinker. The answer is, it has been tried. According to James G. Vail's "Soluble Silicates," Vol. 2, p. 451, following the unquestioned good results of coating the exterior of fresh concrete with sodium silicate solutions, integral mixtures were tried. The results he said were contradictory, although all agreed that soluble silicates hastened the set and reduced permeability. The contradictory results are easily explained in the light of the work of Powers and Steinour. Obviously to derive benefit from sodium silicate, whether it is introduced as such, or is manufactured in place from the alkali-aggregate reaction, there must be plenty of available pulverized silica or silicate for it to work on. Some concretes, such as those referred to by Bryant Mather, have such reactive silica inadvertantly present. Others do not have enough, and the reaction is deleterious.

Plenty of silicate binder, call it calcium silicate or a complex, nonexpanding gel of silica, lime and alkali, is certainly the desirable goal in making cement and concrete. Such concrete should be not only less permeable, but more resilient or less brittle, and hence have two looked-for qualities to promote durability.

DUTCH CEMENT PLANT

(Continued from page 68)

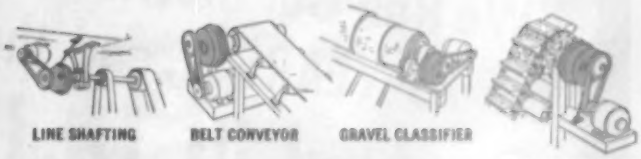
to produce a fertilizer of more constant quality. The K_2O content of the clinker has remained limited to 0.5 percent. Free lime remains between 1 percent and 1.3 percent.

To achieve these results, however, a rather high burning temperature has to be maintained, and a very exact supervision over the burning is required. Since that part of the dust which is sold as a fertilizer is guaranteed for a definite composition, this also requires careful supervision. These difficulties are only negligible in comparison with the advantages realized.

Raise Turnpike Truck Tolls

THE PENNSYLVANIA TURNPIKE COMMISSION has raised truck weight limits, increasing tolls by 33 percent. The allowable weight of truck tractors with tandem axle semi-trailers was raised from 45,000 to 60,000 lb., and tolls increased $5.50 for a total of $23 to travel the entire length of the 360-mile turnpike.

Falk ALL-STEEL Shaft Mounted Drives

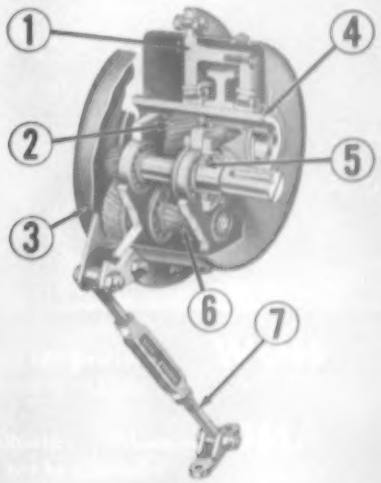


APPLICATIONS UNLIMITED

The range of applications to which the all-steel Falk Shaft Mounted Drive is ideally suited is so wide that complete listing is impracticable. The sketches above are included only to indicate a few typical installations where considerable speed reduction in limited space is an important advantage.

SIX SIZES

- 1/2 to 30 hp
- Single or double reduction
- Wide output speed range—420 to 10 rpm



These versatile, NEW speed-reducing units

save space, power, material and time

Here is the economical solution to the countless application problems requiring efficient speed reduction in limited space! The new Falk all-steel Shaft Mounted Drive—a modification of the universally-accepted Falk Motoreducer design—embodies many exclusive structural and functional features which add up to better service, longer life and substantial savings.

This rugged, compact drive mounts directly on the driven shaft—a distinct saving in floor space. Its precision Falk helical gearing gives highest mechanical efficiency, with a resultant power saving. No adjustable motor bases or slide rails are required. Installation is simple and rapid—output speeds can be quickly changed; thus time is saved...Write to Department 247 for engineering bulletin, including selection and dimension details.

FALK "In-Built" Factors... that give maximum efficiency, convenience and dependability

1 **All-steel Frame,** with more than double the rigidity of iron, supports all rotating elements.

2 **Precision Helical Gears,** designed and machined by Falk, rated to AGMA standards.

3 **Pressed Steel Housings,** whose sole function is to keep oil in, dirt out; easily removed for gear inspection without dismounting unit.

4 **Through Hollow Shaft** with counter bore provides for easiest installation or removal from driven machine shaft extensions.

5 **Backstop** can be furnished with the unit or added later for positive prevention of reverse rotation.

6 **Positive Lubrication,** continuous direct dip of revolving elements at all speeds.

7 **Tie Rod** and turnbuckle serve as anchor and facilitate V-belt or chain adjustment.

THE FALK CORPORATION, Milwaukee 8, Wisconsin

MANUFACTURERS OF

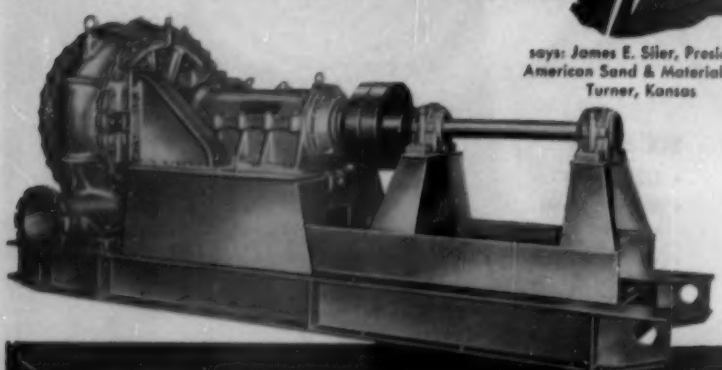
- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

FALK

...a good name in industry

"We Ran Our Morris Pump for 25 YEARS... and then Doubled its Load!"

says: James E. Siler, President
American Sand & Material Co.,
Turner, Kansas



NOW... combining the lower speeds and outstanding reliability of the Morris Type "F"

AND the modern hydraulic design, high heads and efficiency of the Morris Type "G"...

THE NEW MORRIS

DREDGE PUMP

Jim Siler's experience is typical of long-time Morris owners. Heavy, rugged, dependable Morris equipment has been the first choice for abrasive-handling pumps for nearly 90 years.

Morris pumps are engineered to give uninterrupted, year-in-year-out handling of solids at any consistency that is fluid. Some important features of the new Morris GA and GAF Dredge Pumps:

Oversize Shaft and Bearings — easily withstand vibration and shock loads for longer on-the-line service and lower maintenance costs.

Heavy Volute Casing — thicker at points of greater wear, plus a choice of various alloys to increase internal life.

Economical Impeller Design — insures even wear. An enlarged suction shroud maintains effective pressure balancing and high efficiency.

Write today for a complete catalog, or better still, let our engineers help you select the right pump size for your particular needs. No charge or obligation.

MORRIS MACHINE WORKS
Baldwinsville, N. Y.
Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

LABOR RELATIONS

(Continued from page 51)

counsel for defendants specify 13 separate points of alleged error, which we believe may safely be consolidated under 5 topics as follows:

(1) That the State Court is without authority to determine the issues involved in the instant case or to make any award of damages therein for the reasons:

(a) That jurisdiction in labor cases is limited to the federal courts under the provisions of the Labor Management Relations Act of 1947, as amended, 29 U.S. C.A., section 141, et seq., generally referred to as the Taft-Hartley Law;

(b) That plaintiff having evoked the provisions of the federal Act is estopped from claiming under the Colorado law; and

(c) That neither the federal Act nor the state statutes authorize an award of damages under the facts of this case.

(2) That the trial court erred in its determination of damages on the theory of "loss of use" of plaintiff's heavy machinery instead of requiring plaintiff to establish the extent of his profit depreciation resulting from the acts of defendants; and that in any event the evidence was insufficient to sustain the trial court's findings and conclusions.

(3) That the findings of the trial court concerning the amount of damages awarded are inadequate and insufficient to sustain the judgment.

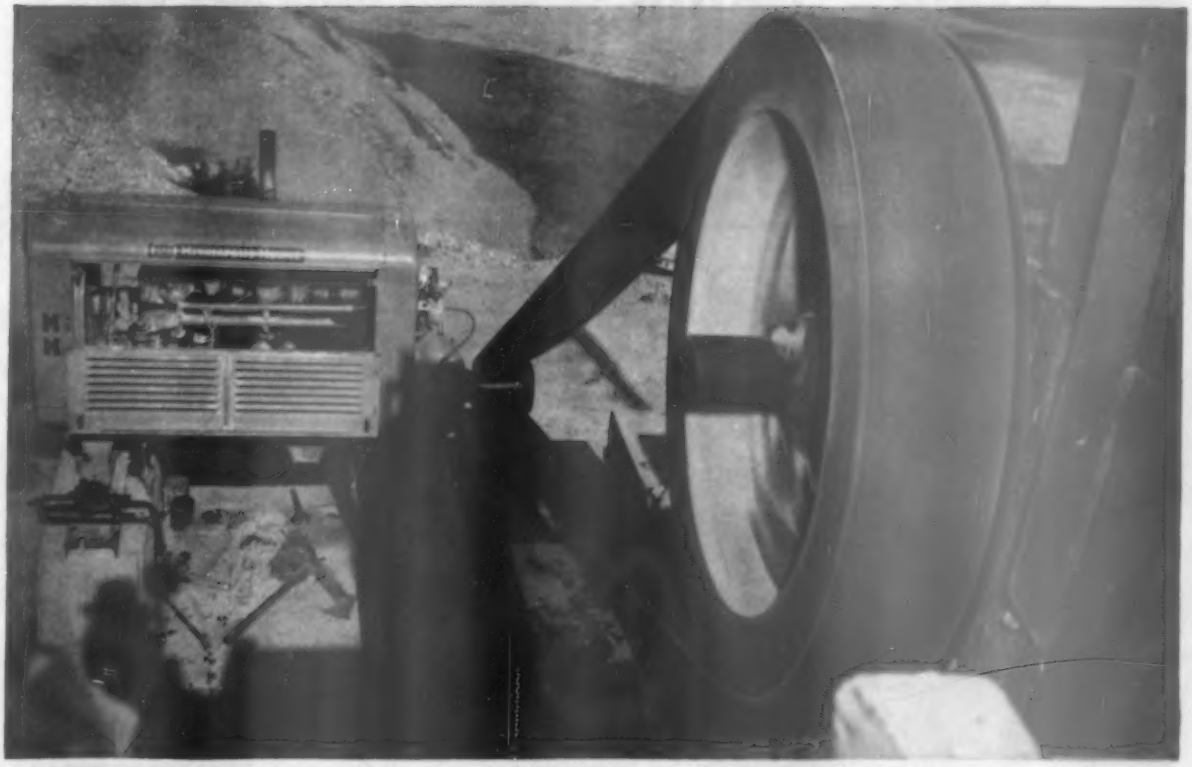
(4) That the contract between the plaintiff and the Engineers Union had expired by a limitation of prescribed time prior to the occurrence of any of the acts complained of, and not being in effect at that time could not have been breached.

(5) That the allowance of damages in lieu of interest and of attorneys' fees as part of the judgment are without authority of any law, state or federal.

Trial Court's Findings

"The record in this case justifies beyond all question of doubt, the correctness of the finding of the trial court that, until the interference interposed by the representative of the defendants, peace prevailed on the highway project being constructed by plaintiff under contract, and that it was only due to the demands and agitation of said defendants' representative that the ensuing difficulty resulted. Under such circumstances, in the days prior to the enactment of legislation, state and national, designed for the peaceful settlement of labor disputes and controversy, one interfering with a work project of another, such as occurred in this instance, certainly would be held liable to the extent of all damages caused by such intrusion. Unless by the enactment of more recent legislation the right to be so protected, under similar circumstances, has been eliminated, modified or otherwise circumscribed, it still exists."

The court then proceeded to discuss the provisions of the Colorado Labor Peace Act, which is, like many similar state laws, modeled after the N.L.R.A. These, while guaranteeing the right to organize, are designed to protect workmen from coersion both by the employer and by the union. The lower (trial) court found the union in violation of the Colorado law. The union contended that the Colorado courts lacked jurisdiction; that the Taft-Hartley Act was supreme in

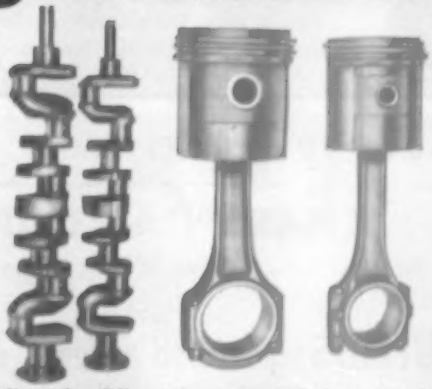


These Crushing Plants Went Shopping and Saved!

An MM 425-6A LP gas power unit best filled the requirements of this Illinois sand and gravel producer when he went looking for a heavy-duty engine to power roll and jaw crushers. His objective was to get

- a factory equipped engine for lowest cost fuel
- low fuel consumption at maxium power and load
- minimum down time and maintenance
- convenience of installation and operation.

The 425-6A more than filled the bill because MM engines are fully and separately designed for gasoline, LP gas, natural gas, diesel, or distillate—MM high turbulence combustion and ample displacement result in high torque at low rpm—long-run features like MM vacuum crankcase ventilation and improved oil filtering require less service—available equipment includes selection of power take-off drives, couplings, rotation and speeds—partial or full enclosures—radiator or cooling coil—choice of location for controls and instruments—electric starter and generator—water-cooled manifolds and heat exchanger jacketed base pan.



Here is how MM part size goes up as displacement and hp go up to supply heavier construction necessary for continuous heavy load operation. Crankshaft, connecting rod, and piston of MM's 108 hp 605-6A engine are shown side by side with those of the next larger MM engine, the 148 hp 800-6A. Size and weight where it counts does the job longer and without strain.

Minneapolis-Moline engines are available from 29 hp to 291 hp, can be outfitted for specialized applications meeting all original equipment and replacement requirements within size ranges. Specifications and engineering service available on request.

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INDUSTRIAL DIVISION
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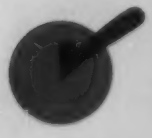

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The new WILFLEY MODEL K Centrifugal Sand Pump embodies important mechanical improvements especially adapted to the handling of cement slurry and results in stepped-up production and substantial power savings. Individual engineering. Write for details.

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WILFLEY centrifugal PUMPS

KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

such a case. However, in this case, the National Labor Relations Board subsequently found the union guilty of an unfair labor practice, and its finding was subsequently affirmed by the United States Circuit Court of Appeals.

Recovery of Damages

The Colorado Supreme Court decision then continues: "Counsel for defendants insist that since plaintiff instituted proceedings against defendants before the National Labor Relations Board, he may not now resort to the state court, but must obtain his relief, if any, through that Board or pursuant to the provisions of the Taft-Hartley Act, which they contend affords no relief. With this theory we cannot agree. In the first place we think defendants' interpretation of the Taft-Hartley Act is erroneous, as it would award said relief to plaintiff under the circumstances here detailed if suit had been commenced in the federal court, but this is rather beside the point since the action is in the state court. Primarily the fault in defendants' contention is that they overlook the fact that the National Labor Relations Board is but a fact-finding Board with limited authority to effectuate its determinations. Without a finding by the said Board that the law is being violated, it has sometimes been held that state courts are without authority to enjoin union activity, but where the determination of the Board is to the contrary, as in the instant case, such determination definitely establishes a violation, leaving recovery of damages for the resulting injury to any court of competent jurisdiction."

Here the court discussed in detail various relevant decisions, which the legal counsel of our producer readers will undoubtedly want to study. To proceed with the story, the court decision continues as follows: "Regardless of the various ramifications of the federal statute, which are discussed herein only because defendants erroneously insist that the federal law controls, it must be remembered that this action is brought under the state law, where specific provision is to be found covering this situation. The applicable statute is 80-5-19, C.R.S. '53, reading as follows:

> 80-5-19. Civil liability for damages.—(1) Any person who suffers injury because of some act of unfair labor practice, as defined in this article, shall have a right of action, jointly and severally against all persons participating in said action for damages caused to the injured person thereby.
>
> (2) If in accordance with this article or otherwise, persons otherwise unwilling to do so are induced to violate contracts of employment or for services or materials, any person injured thereby shall be entitled to recover at law against the persons, jointly and severally, so inducing the violation of such obligations and have judgment therefor.

(Continued on page 152)

Dempster-Diggster bucket GETS A FULL LOAD WITH EVERY STROKE!

The hydraulic crowd and hoist operation of the new Dempster-Diggster GRD-101 gives you big shovel advantages in front end loading and excavation work. As shown in the at-work photos at right, here's what happens: Dempster-Diggster moves into material with shovel lowered against front of frame. No wheel traction is used to get excavation power. The hydraulic crowd and hoist moves bucket out and up following contour of material—getting a full bucket with every stroke . . . reducing loading time and idle truck time, thus getting the job done faster!

When you put your Dempster-Diggster into operation, one of the first things you will find is that your entire operation must be geared to a faster pace. This means greater efficiency of equipment and manpower—more profit to you!

Write us asking for Folder No. 3116 giving you complete information on the features of the Dempster-Diggster, including TRUCK-SPEED MOBILITY TO AND FROM JOBS . . . AUTOMATIC BUCKET TRIP . . . MAXIMUM DUMPING AND DIGGING HEIGHT . . . MINIMUM TURNING RADIUS . . . THE SHOVEL WITH TORQUE CONVERTER . . . HYDRAULIC STEERING, etc. Manufactured by Dempster Brothers, Inc.

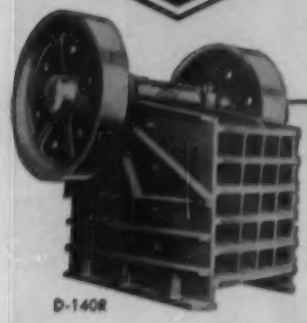
In photo below camera catches Dempster-Diggster ready to back off and move up to a truck for loading.

DEMPSTER DIGGSTER

DEMPSTER BROTHERS, 3105 N. Knox, Knoxville 17, Tennessee

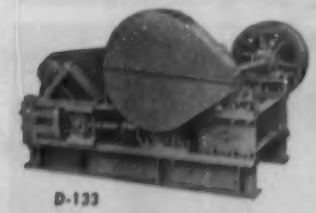
DIAMOND

Serves Every Aggregate Producing Need


D-140R

JAW CRUSHERS

Aggregate producing ability, strength and economical maintenance are included in Diamond's exclusive design. Its long, deep jaws and flat crushing angle handles the hardest rock with minimum effort. Jaws are manganese steel and reversible for extra service life. 11 sizes. Capacities 1½ to 500 tons per hour. CATALOG 600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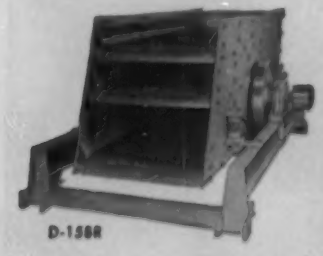
ROLL CRUSHERS

A perfect finishing crusher, equipped with special bearings and drive arrangement to relieve stresses. Features floating roll and safety spring releases. Six sizes. Capacities 10 to 200 tons per hour. Chain or Star Gear Drive. CATALOG D-5413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VIBRATING SCREENS

Scalping and Scrubbing Screens Drag Washers

A Diamond balanced vibrator cannot be choked. There is generous room between decks. The vibrating action is evenly distributed to every part of the screening area. Fast, easy flow of material with a thorough separation job is normal performance for Diamond screens. Ask for Catalog D-5412, which also describes Scalping and Scrubbing Screens as well as Drag Washers.

D-155

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Apron and Plate Feeders, Grizzlies, Storage Bins—a complete line and range of sizes are described in CATALOG D-101

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Sectional Steel Conveyors—three featured styles. Bucket elevators, Conveyor Rolls, Belt Conveyors. Stationary conveyor systems built and installed to suit every requirement and condition of service. All described in CATALOG D-5416.

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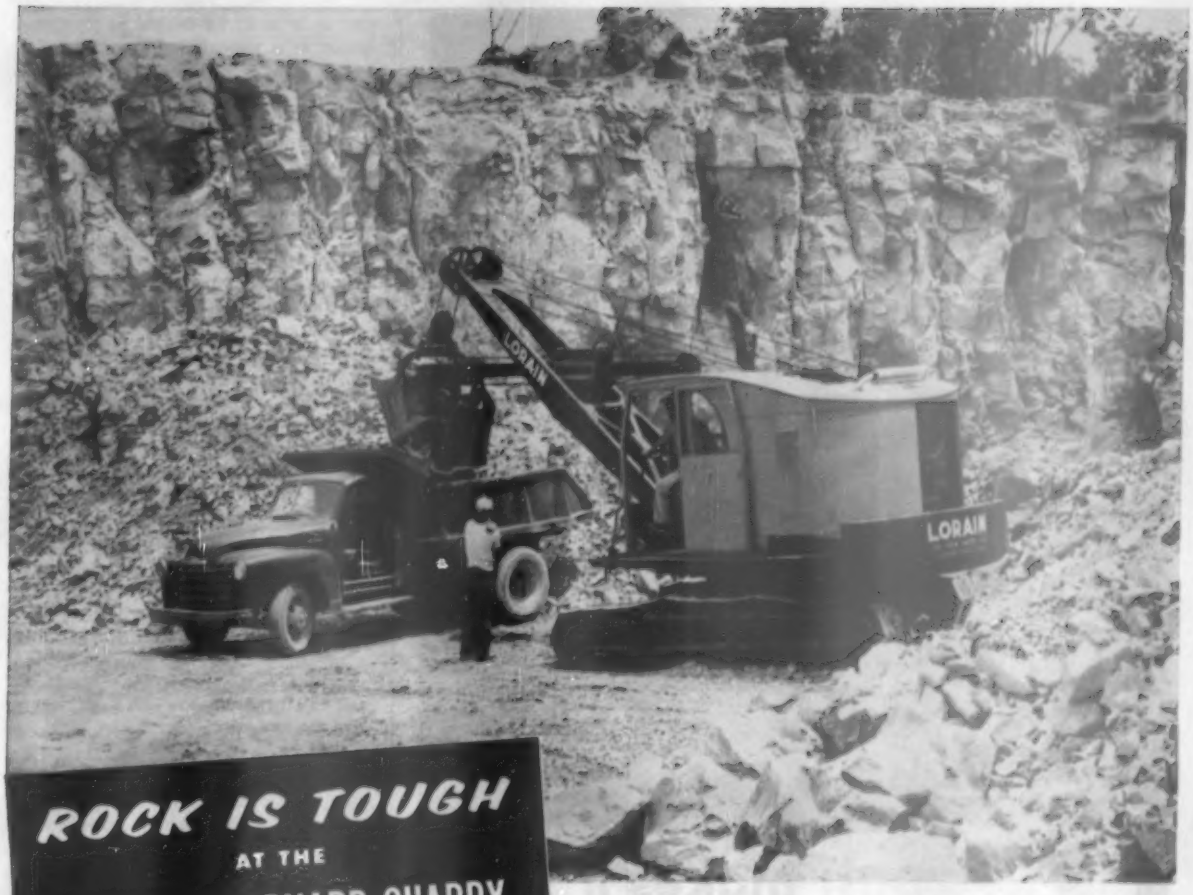
Rock, Sand and Gravel Crushing, Screening, Washing and Conveying Equipment—Portable and Stationary Plants

LABOR RELATIONS

(Continued from page 150)

"The trial court based findings of the extent of damage upon the loss of use of heavy equipment due to the interference with his work project by the unlawful acts of the defendants. It is contended on behalf of defendants that the theory adopted by the trial court is erroneous and that the extent of damages should have been determined on the basis of loss of over-all profits on the job. They insist, that notwithstanding some delay in the completion of the contract by reason of the acts of defendants complained of, nevertheless, the plaintiff made a substantial profit on the job and could not have been damaged to the extent found by the trial court if determined on that basis. It seems to be defendants' position that since plaintiff made a profit, he could not have suffered damage. This is argument in a circle, since there is no way of determining the extent of profit which plaintiff would have realized had he not encountered the delay caused by the unlawful interference of the defendants. Defendants would propose loss of profits as the basis of recovery and then attempt to show that plaintiff failed in his proof. Should it appear that plaintiff had actually suffered a loss on the contract project, or made no profit at all, would defendants agree that the measure of damages is the difference between such deficit and the amount of profit normally accruing from similar contracts? We believe not. Many factors not involved here enter into profit realization. It is impossible to allocate to each of several heavy machines on the job the proportion of the over-all profit attributable to the agency of each thereof. Apparently for this reason the rule has generally been adopted that where through unlawful or wrongful acts of defendants heavy equipment has been kept idle and the work expected to be accomplished thereby delayed, the fair rental value of such equipment during the period of prevention of its use is generally adopted as a proper measure for determination of the extent of damage.

"In our opinion the trial court followed the only logical method by which the extent of damages could be in any wise accurately measured. To have followed the theory advocated by defendants would have been pure guesswork and speculation. In adopting the loss of use rule the trial court had in its hand a yardstick by which accurate determination could be made. Such method, furthermore, is in keeping with the general rule that damages should be calculated in such man-



ROCK IS TOUGH
AT THE
RIGSBY & BARNARD QUARRY
LORAIN-26 IS TOUGHER!

This heavy-duty ¾-yd. Lorain-26 Shovel is the 3rd Lorain that Rigsby & Barnard Quarry of Cave-in-Rock, Illinois, have counted on for dependable, low-cost digging in their quarry. It is handling tough limestone against a 12-ft. face. Partner R. G. Barnard says . . . *"The Company is well satisfied with this shovel."*

LORAIN-26 FEATURES THAT PAY OFF IN ROCK

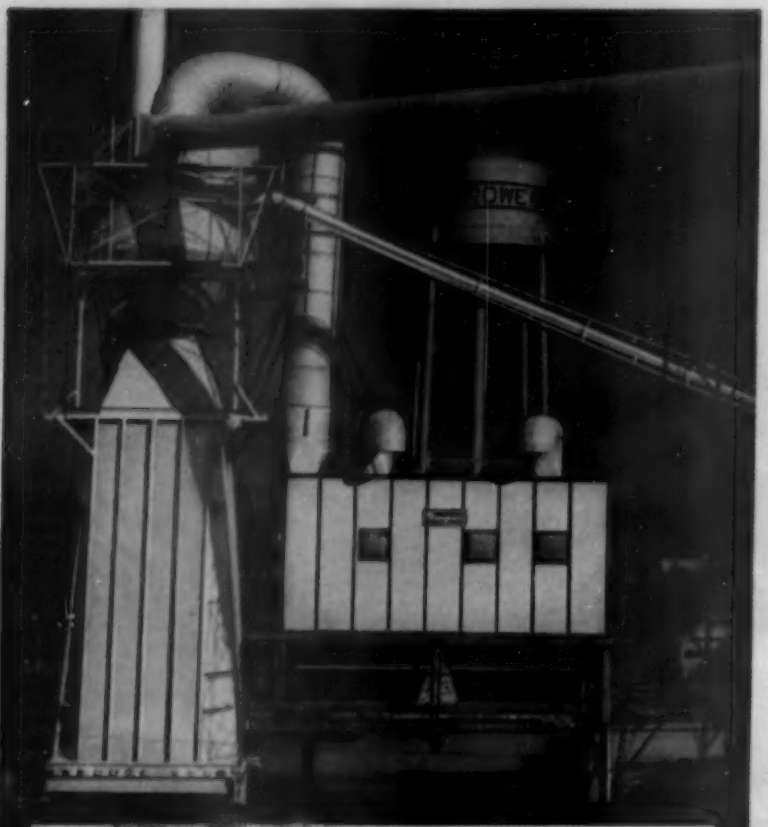
There's a long list of new design and performance features in the "26" you should investigate . . . here are a few:

• A real, heavy-duty ¾-yd. shovel—greater weight (over 47,000 lbs.), increased power • A no-stall, non-shock Hydraulic Coupling power take-off • "E-Z" Controls for fingertip operation—providing 70% less operator effort • Hydraulic power crawler controls • Greater lifting and working capacities when used as a crane • 19 ft. shovel boom for greater digging ranges • Newly-designed, sturdier, wider 2-speed Crawlers with 29" wide treads • A sturdier, all-welded Turntable Bed.

Ask your Thew-Lorain Distributor to show how Lorains can best fit your quarry . . . from shovel sizes through 2½ cu. yds., on a wide selection of crawler or rubber-tire mountings. Take time to look at Lorains!

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN



Dust makes it "hot" for Rowe!

Pangborn Dust Control saves Rowe over $12,000 a year in heating costs

Dust used to "make it hot" for Rowe Manufacturing Co., Galesburg, Ill., by posing a serious problem. Rowe, a large producer of wood products (like the Ro-Way garage door), was troubled by the great volume of dust created by its many woodworking operations. Today dust makes it hot for Rowe in a different way! Thanks to Pangborn Dust Control, collected dust now fuels the boilers that provide steam for power and heat. The dust collected by Pangborn Dust Control saves Rowe over $12,000 in heating costs annually! In addition, Pangborn has improved community relations, employee relations and plant cleanliness.

Pangborn can solve *your* dust problem. Pangborn engineers will be glad to show you how Pangborn Dry or Wet Dust Collectors can save you time, trouble and money!

See how Pangborn benefits varied industries. Write for free copy of "Out of the Realm of Dust." Pangborn Corp., 4500 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control and Blast Cleaning Equipment.*

Pangborn
CONTROLS DUST

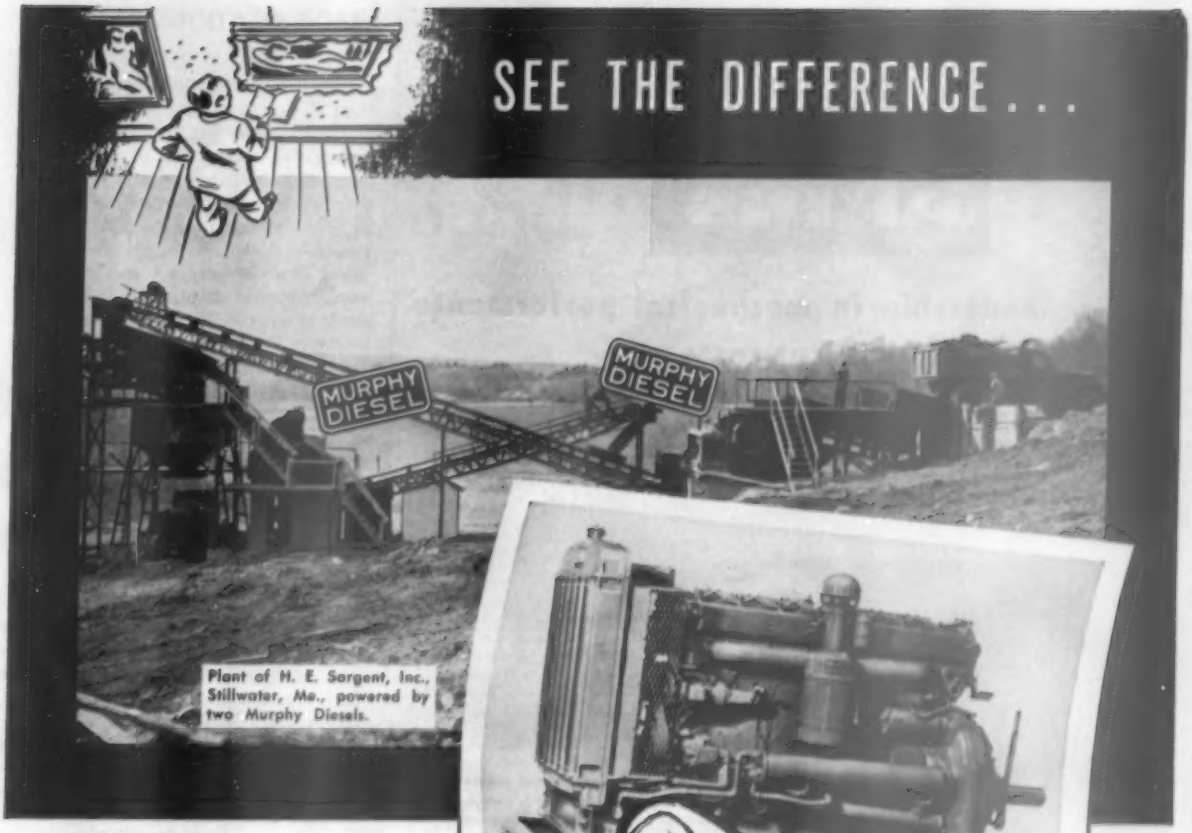
ner as is most favorable to the party liable. It is logical that the rental cost or value of a machine would be less than the amount expected to be derived from its use. If it can be rented for a sum equal to the amount it will return in use, why use it? If one should rent a machine to do a specific job, would he not expect to make a profit for himself over and above the rental he would have to pay? Highway construction machinery has a well-established, recognized rental value which, in this case, was testified to by competent disinterested witnesses.

"On behalf of defendants it is contended that the record does not support the findings of the court even on the basis of loss of use, but it would seem to us that the trial court has been careful and judicious in calculating the fair rental value of the machinery over the period its use was made unavailable to the plaintiff because of interference through the illegal acts of defendants. In its findings the trial court allowed full credit against plaintiff's claim for all the time that any of said machinery was employed by plaintiff on jobs other than the contract project. While it may be that others might have arrived at a somewhat different figure than did the trial court, we are unable, from the record, to say that its findings concerning the primary damage item are in any way unsupported by the evidence, and, therefore, it must be and is sustained.

"While it is true that the loss of use rule in the calculation of damage under circumstances as here detailed is more usually applied to instances where actual possession of the property is taken and detained by defendants and plaintiff is totally deprived thereof, we fail to see any merit in defendants' contention in the instant case that plaintiff retained actual possession of his machines and equipment. While it is undoubtedly true that defendants did not actually take possession of said equipment, they deprived plaintiff of the use thereof just as effectively as if they had put it under lock and key. When the members of the Engineers' Union violated their contract and walked off the job, individually refused to cross the picket line and, supported by the union in refusing to furnish union members to operate said machines, they completely immobilized and rendered entirely useless all of said machinery to the same extent as though it had been retained in their possession and actually impounded. It is simply a difference in the method of depriving the plaintiff of the use of his property and is ineffective to relieve defendants of liability for their breach of contract.

(Continued on page 156)

SEE THE DIFFERENCE . . .



Plant of H. E. Sargent, Inc., Stillwater, Me., powered by two Murphy Diesels.

. . . when you put MURPHY DIESEL in the picture!

When you bring Murphy Diesel into your operating picture, you see a big difference in many ways.

You'll see the difference in your fuel cost records — because the Murphy Diesel costs less to operate than any other engine of comparable size.

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Check the experience of other rock operators and then ask your Murphy Diesel Dealer to show you what a difference a Murphy Diesel will make in your picture.

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for rock crushing

Murphy Diesel Engines and Power Units for rock crushing, 96 H.P. to 248 H.P. Generator Sets, 60 K.W. to 155 K.W.

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how

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Classifiers and heavy media separators are selected on the basis of low-cost-per-ton output resulting from efficient, dependable mechanical and metallurgical performance. That's why so many successful mining companies throughout the world continue to order and reorder Akins.

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- **Meehanite metal gears** the bevel gear and spur gear are made of Meehanite metal. With Meehanite it is possible to obtain definite pre-determined and uniform properties to best meet the requirements of each application. Its uniform density, high tensile strength, and fatigue strength provide special qualities of toughness and resilience.
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- these features, like the patented submerged bearing and rugged main shaft, result in more efficient operation – thus, low-cost-per-ton production.

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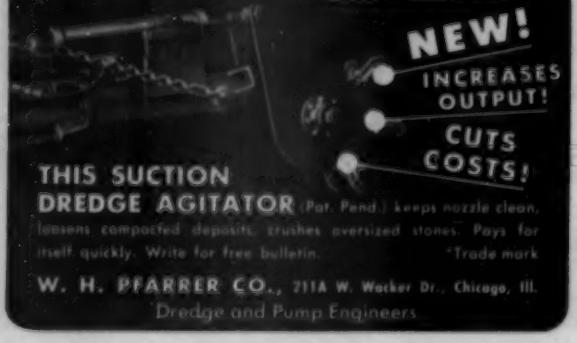


THIS SUCTION DREDGE AGITATOR (Pat. Pend.) keeps nozzle clean, loosens compacted deposits, crushes oversized stones. Pays for itself quickly. Write for free bulletin. *Trade mark

W. H. PFARRER CO., 211A W. Wacker Dr., Chicago, Ill.
Dredge and Pump Engineers

ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

LABOR RELATIONS

(Continued from page 154)

"With respect to the engineers' contract it is urged before us that same had expired by limitation of its term before the occurrence of any of the acts complained of, and therefore there could have been no breach thereof. This is not in accordance with the record in this case which shows definitely that the contract was originally executed between plaintiff and the defendant engineers' union; that by its terms it would have expired prior to the acts complained of by plaintiff except for the fact that it had been renewed for one year and was in full effect at the time of the events herein referred to. The trial court so found, the record so shows and the pleadings admit it.

"It is objected that the findings of the trial court with respect to damages are inadequate and insufficient to form the basis of any award. The record fails to disclose a request on behalf of defendants for special findings, and even though such request had been made and refused, it is not incumbent upon the trial judge to prepare, nor is he required to file in the record an exact detailed accounting or bill of particulars of all items which he has considered in arriving at his conclusions. He need make only pertinent general findings and is not obliged to go into detail as defendants' counsel seems to believe.

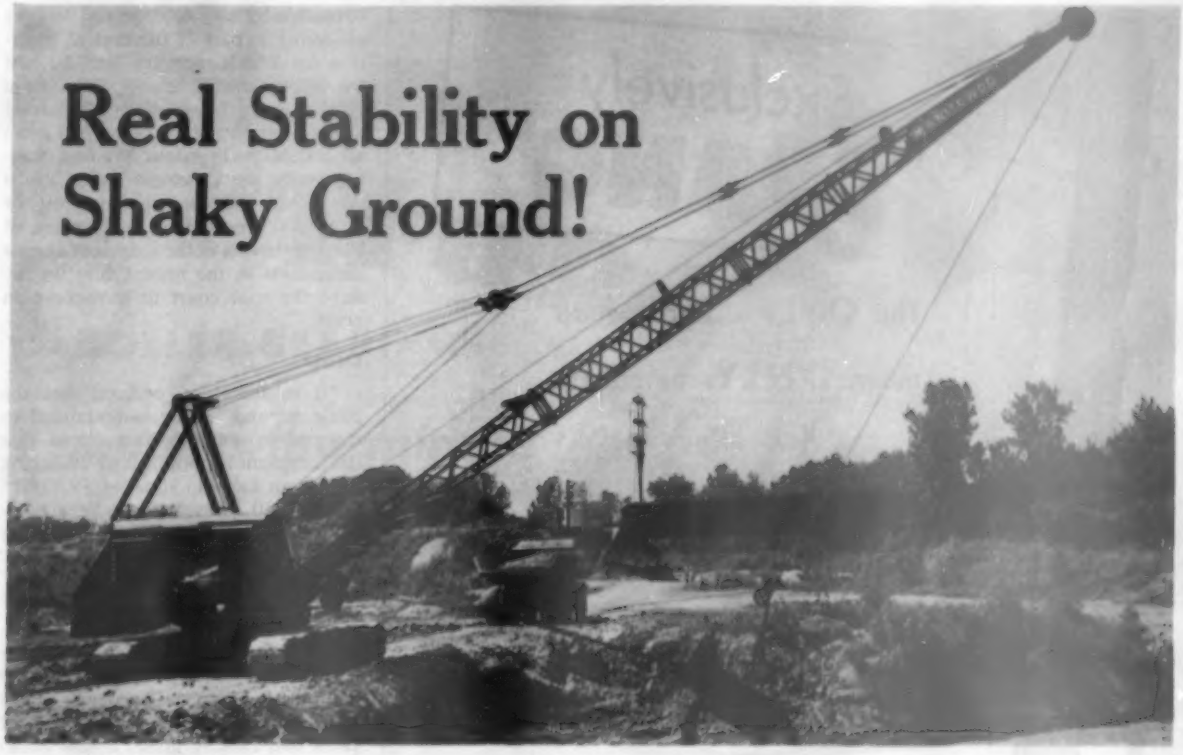
Interest, Etc.

"Objection was made on behalf of defendants to the allowance by the trial court of the sum of $8,428.25 as additional damages, being an amount equal to and apparently in lieu of interest at the rate of 6 percent per annum on the principal damage item of $26,000. On behalf of plaintiff it is urged that the item is not interest but a proper item in the calculation of damages. If this be true we are inclined to believe that such an "in lieu" item might well be included in all damage actions wherein interest was not allowed by statute. We think the better rule would be to adhere to our formerly announced general policy that interest, or any other sum equal to and in lieu thereof, can, in the absence of contract, be awarded only when specifically provided for by statute.

"What we have said with reference to interest is generally true also with respect to allowance of attorneys' fees. It has been the policy of the law in this jurisdiction that, in the absence of contract or appropriate valid statutory enactment, attorneys' fees are not re-

(Continued on page 158)

Real Stability on Shaky Ground!



Manitowoc Lower Works Design Provides Greater Stability on Treacherous River Bank

Arrow Sand and Gravel Company of Columbus, Ohio has the ticklish job of taking stone from an open pit near the Scioto River while working from the unsteady river bank. The job site is located directly across the river from the Columbus water filtration plant.

Because of the difficult footing, Arrow chose a Manitowoc dragline having the positive stability needed for full boom reach without imposing undue pressure upon the river bank during bucket return. Equipped with a 4-yd. bucket and an 80′ boom working at an 85′ radius, their Manitowoc 3900 dragline completely fills two 15-yd. trucks with stone in just five passes each.

Due to the Manitowoc's remarkable stability, the hook rollers never even touch the top flange of the ring gear during dragging and loading operations. These adjustable hook rollers at the rear almost double the effective diameter of the roller path by reducing roller loads. Machine stability is assured no matter what front end equipment might be used.

Other features contributing to the Manitowoc 3900's greater stability: 20′4″ long crawlers — spread wide — provide low ground pressure; a simple, alloy steel carbody totally enclosing travel shaft clutches and gears; and an extremely simple drive with dependable jaw type steering.

Clean, efficient design throughout means greater speed — more cycles per working day. The Manitowoc has only 14 gears and only working gears turn. This direct power flow gives top line pull and speed with fewer parts. Smooth, disc-type swing and travel clutches and air controls make the job easier for any operator — assure precise bucket control.

TORQUE CONVERTER makes uneven load handling a thing of the past. Smooth, steady power causes bucket to dig and settle on the return for a full capacity load. All hoisting operations are by accelerator control only, resulting in uniform performance. Oil cushion absorbs all shocks.

Put a Manitowoc to work in *your* quarry or pit. Smart operators settle for nothing less in peak performance, smooth operation and long working life. Full details and specifications from your Manitowoc distributor. MANITOWOC ENGINEERING CORP., MANITOWOC, WIS.

MANITOWOC

SHOVELS 1-5 YD. Speedcrane CRANES 20-100 TON

Exclusively
SPANG
The ONLY...and we do
mean ONLY completely
weldless alloy-steel
jars
in service in the
drilling industry
One piece—no welds to break.
Drills up to four times more footage with less time and costs spent on fishing jobs!
For Cable Tool data and catalog see your Spang dealer or write to:
SPANG & COMPANY
DEPT. M-6
BUTLER, PENNSYLVANIA
For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Prospect Drilling and Shot Blast Holes.

T.C.
WOVEN WIRE SCREENS
ACCURATE • DURABLE • ECONOMICAL
The reliability of T.C. Alloy Screens has carried them into all parts of the world. Made in Standard and Special Weaves, with Square or Oblong Openings – from 10 mesh, .035" wire on up. Write today for Catalog No. 53.
TWIN CITY IRON & WIRE CO.
35 W WATER STREET • ST PAUL 1 MINNESOTA
KEEP ABREAST WITH INDUSTRY TRENDS THROUGH ROCK PRODUCTS

coverable by way of damages, are not allowable as part of the cost of litigation for which recovery may be had by the successful litigant, but are a burden upon the employer of counsel as his contribution of the general overall cost of the litigation. We find nothing under the Colorado Labor Peace Act which allows either interest or attorneys' fees and in its inclusion of these two items in the judgment against defendants in the instant case we believe the trial court to have been in error.

Order

"It is, therefore, ordered that the cause be and hereby is remanded to the trial court with instructions that the judgment be modified by excluding therefrom the said sums of $8,428.25 and $3,250, thus reducing the judgment to the sum of $26,000, and the judgment as so modified is affirmed."

Manual on Hearing

WITH EMPLOYE HEARING MEASUREMENT PROGRAMS becoming of top importance to industry because of recent court decisions, new legislation and a growing concern over the problem of plant and factory noise, a new booklet, "Guide for Industrial Audiometric Technicians," just published by Employers Mutual of Wausau proves both timely and informative.

The new manual is intended to furnish training and reference material for those who are learning to operate audiometers to conduct pre-employment hearing measurements. Particular emphasis is placed on the techniques required in securing accurate data and the proper method of recording findings obtained from the examinations. It is based on information gathered by the insurance firm in more than a year's experience in setting up this kind of program at both the industrial and community level. Copies of the guide may be obtained, without charge, by writing to: Accident Prevention Department; Employers Mutuals of Wausau, Wausau, Wisconsin.

Missouri Cement Earnings

MISSOURI PORTLAND CEMENT CO. has reported a net income of $1,332,118 on net sales of $8,504,976 for the six months ended June 30, 1955. This compares with net earnings of $989,926 and sales of $7,266,251 in the first half of 1954.

Held Open House

NATIONAL GYPSUM CO., Shoals, Ind., held "open-house" September 21 and 22, at its recently opened plant. The plant produces several carloads of gypsum daily, and with peak production, will produce 20 carloads daily.

ROLLWAY

Tru-Rol

ROLLER BEARINGS

...up-to-the minute design... plus economy

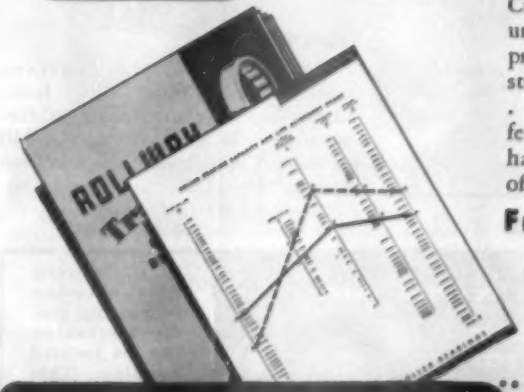
All Tru-Rol Bearings Now Have

CROWNED ROLLERS . . .

Crowned Roller under full load — stress uniformly distributed.

• Proved in performance . . . proved for economy . . . unsurpassed for versatility . . . the Tru-Rol Bearing incorporates the design know-how accumulated through Rollway's many years of experience with all types of cylindrical roller bearings. Tru-Rol's features result in adaptability for any application requiring just the right balance between precision and economy.

• Designed for Versatility: Tru-Rol is available in all the inner and outer race combinations demanded by today's design. Crowned cylindrical rollers eliminate end loading—assure a uniform stress pattern along the *full length* of each roller, and prolong bearing life. Tru-Rol versatility offers a choice of stamped steel retainers with *guide lips*, or steel segmented retainers . . . both providing perfect alignment for every roller. These features have been quick to gain favor with engineers, and have led to the selection of Tru-Rol Bearings for a broad variety of applications.



Free! New Catalog . . .

36 pages of Valuable Information—Mail Coupon Today. The Tru-Rol Catalog includes all required data on every size, every type of Tru-Rol Bearings; complete description, ratings, dimensions—plus *extra* copies of the new Quick-Calculating Alignment Chart . . . a *graphic* solution of the *RBEC formula for bearing selection.

*Roller Bearing Engineers' Comm.—Anti-Friction Bearing Mfgs. Assn.

ROLLWAY BEARINGS

COMPLETE LINE OF RADIAL AND THRUST CYLINDRICAL ROLLER BEARINGS

ROLLWAY BEARING CO., INC.
573 Seymour St. • Syracuse 4, N. Y.

Please forward free copy of your new Tru-Rol Catalog with extra Alignment Charts.

Name_____ Title_____

Firm Name_____

Address_____

City_____ Zone_____ State_____

ENGINEERING OFFICES: Syracuse • Boston • Chicago • Detroit • Toronto • Pittsburgh • Cleveland • Milwaukee • Seattle • Houston • Philadelphia • Los Angeles • San Francisco

1-cu. yd. Sauerman Slackline Cableway began operations in 1921

Company expanded output with this 2-cu. yd. Sauerman Slackline Cableway in 1948.

Minnesota Gravel Producer Gives the Facts on Recovery with Slackline Cableway

Guaranteed Gravel and Sand Co.'s 2-cu. yd. Sauerman Slackline Cableway, installed in 1948, replaced a similar unit of 1-cu. yd. capacity. Combined service of these two machines adds up to over 33 years company experience in the mechanics and economics of underwater recovery with Sauerman Slackline equipment.

Management of the Minnesota operation believes that a slackline has many definite advantages where the inhaul is long and the material is below water. Faster than other types of equipment, the company capitalizes on the slackline's speed over a maximum inhaul of 700 ft., with an average of 250 to 300 ft. A shift can be made in about an hour, if the material suddenly falls off, and it is possible to recover from depths exceeding 100 ft.

Due to the height from which the material is discharged, the slackline cableway readily lends itself to stockpiling. The surge pile can be built to a height of over 60 ft. This makes it possible to operate during periods when the river end of the plant is idle, thus averting complete shutdown such as might well occur if other types of recovery and stockpiling equipment were used.

The present slackline is operated by a Sauerman Roller Bearing Hoist, driven by a 6-cylinder diesel. The 80-ft. mast is so located that the effective height above water level is approx. 95 ft.

Complete details on the above operation were recently published in a leading aggregates producer publication. For full information contact Sauerman Bros., Inc., and request Catalog C., Slackline Cableways.

SAUERMAN BROS. INC.

630 S. 28th Ave. BELLWOOD, ILL.

Report on Uranium

U. S. GEOLOGICAL SURVEY has published Bulletin 1030-A, "Search for Uranium in the United States." Prepared by Vincent E. McKelvey, the report reviews the more common uranium minerals, discusses characteristics and distribution of various types of deposits.

The author points out that nearly all igneous rocks contain traces of uranium, and consequently the potential uranium tonnage in these rocks is enormous; however, at this time, these sources cannot be considered of economic importance.

Deposits in limestone, asphaltite, shales, placers, and in phosphorite and phosphate deposits are discussed. Uranium-bearing continental sandstones and conglomerates, the author says, include the largest known uranium source in this country (the Colorado plateau) and the largest known in the world (Witwatersrand of South Africa.)

Short reviews of the various methods of uranium prospecting are given, covering geologic, geophysical, botanical, geochemical and physical. The author distinguishes two opposite approaches which he calls the "uranium is where you find it" and the analytical, "uranium is where it ought to be" approach.

Bulletin 1030-A is a 64-page pamphlet containing five maps, an index, and several pages of references pertaining to uranium prospecting. Copies are available at 25¢ each from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

Stock Split

NORTHWESTERN STATES PORTLAND CEMENT CO., Mason City, Iowa, stockholders have approved a two-for-one stock split at a par value of $10 per share. Capitalization has also been increased from 200,000 shares of no-par stock to 800,000 shares.

ARMSTRONG-BRAY HYDRAGRIP HYDRAULIC PULLERS

Write for catalog — describes HYDRAGRIP and complete line of accessories.

Makes tough jobs easy—saves parts Quickly, safely and easily removes sleeves, wheels, gears, bearings, sheaves or parts from shafts. Saves time, saves parts — stops battering and breakage. Single centered ram assures aligned thrust — no wedging or binding. Portable—easily carried. Few strokes of handle builds pressures up to 17½ tons. Operates standard wheel pullers, or special accessories.

ARMSTRONG-BRAY & CO.
5386 NORTHWEST HIGHWAY - CHICAGO 30, ILL.

In a Hayward, there's no contact between the closing mechanism and the material handled. This means much less wear, reduced upkeep, big savings in bucket maintenance. THE HAYWARD COMPANY, 50 Church St., New York 7, N.Y.

HAYWARD BUCKETS

CLAM SHELL • ELECTRIC • ORANGE PEEL • GRAPPLES

famous for performance since 1888

RAYMOND

SUPER ROLLER MILLS

For Grinding:

LIMESTONE
GYPSUM
BAUXITE
BARYTES
PHOSPHATE
ROCK and
many other
NON-METALLIC
MINERALS

RAYMOND SUPER ROLLER MILL Equipped with double automatic feeders and whizzer separator with individual variable speed drive. May be equipped with Flash Drying Accessories for removing moisture.

RAYMOND builds a full line of Mills for pulverizing non-metallics, chemicals and manufactured products—in a range of sizes to meet your capacity requirements, from a few hundred pounds to thirty tons or more per hour.

for
producing
10 - 20 - 30
or more tons
per hour

Large capacities mean low costs when you use Raymond Super Roller Mills.

These big machines operate on a "mass production" basis, delivering maximum tonnage in minimum floor space.

This method centralizes operations, simplifies material handling, insures uniformity of product, conserves space, and saves manpower.

It also offers important economies in installation, maintenance and supervision costs, as compared to a multiple mill installation of equivalent output.

If you are replacing or augmenting your present grinding equipment, or building a new pulverizing plant, you should look into the advantages of Raymond Super Roller Mills.

Write for Catalog #72

COMBUSTION ENGINEERING, INC.

1307 NORTH BRANCH ST.
CHICAGO 22, ILLINOIS

Raymond Division

SALES OFFICES IN
PRINCIPAL CITIES

Combustion Engineering-Superheater, Ltd. • Montreal, Canada

Interior of a Hardinge 11½' x 12' Rod Mill with 85-ton rod load, 1000 horsepower.

Hardinge
ROD MILLS

Sizes range from 2' to 11½' shell diameter and up to 1000 horsepower.

Types include trunnion overflow and peripheral discharge for both wet and dry grinding.

Applications include both open and closed circuit arrangements for ores, aggregates, concrete sand, cokes, and abrasives.

Complete specifications on request. Bulletin 25-C-7.

Trunnion overflow mill

End peripheral discharge mill

Center peripheral discharge mill

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 Arch St. • Main Office and Works

New York • Toronto • Chicago • Hibbing • Houston • Salt Lake City • San Francisco

MORE TONNAGE *with* **FORGED STEEL DROP BALLS**

MORE PROFITABLE, EFFICIENT SECONDARY BREAKAGE. WE CAN SHIP IMMEDIATELY.

2000 to 12000 lbs.

The "Cape Ann" Forged Steel Drop Ball is standard equipment in up-to-date quarries. It has a forged connecting link, protected by deep recess, adaptable for swivel or shackle. Strong alloy steel pin. Low cable replacements. Furnished complete as shown.

WRITE FOR PRICES AND INFORMATION

CAPE ANN ANCHOR & FORGE CO.
P. O. BOX 360 GLOUCESTER, MASS.

MANUFACTURERS NEWS

International Harvester Co., Chicago, Ill., has announced the appointment of John W. Branta as supervisor of motor truck advertising to succeed Samuel E. Houston, who has retired. William A. Adler has been appointed sales promotion supervisor. Fred J. Grede continues as general supervisor of truck advertising and sales promotion in the consumer relations department, while Robert B. McAllister, supervisor of dealer advertising, has been named editor of the company's publication, International Trail.

Hewitt-Robins, Inc., Stamford, Conn., has acquired the business, manufacturing facilities and assets of the W. A. Jones Foundry & Machine Co., Chicago, Ill., manufacturer of heavy-duty speed reducers, pulleys, gears, etc. The company will be operated as the Jones Machinery Division of Hewitt-Robins with Thomas A. Jones, president of the foundry and machine company, as manager of operations of the Chicago plant. All other operating and distribution personnel will also become associated with Hewitt-Robins.

Cummins Engine Co., Inc., Columbus, Ind., has appointed the Cummins Diesel Sales of Alaska, Inc., as distributor for the entire Territory of Alaska, with headquarters at Anchorage, a branch at Ketchikan and an office in Seattle, Wash. Dale Ungerecht is manager at Anchorage, and Don Nafziger is manager of the Ketchikan branch.

Fruehauf Trailer Co., Detroit, Mich., has announced the appointment of John J. Bohmrich as assistant to the vice-president. He was formerly general manager of three divisions of A. O. Smith Corp., Milwaukee, Wis.

Pettibone Mulliken Corp., Chicago, Ill., announces that Herbert J. Knudten has been elected vice-president of the company in addition to his duties as president of Universal Engineering Co., Cedar Rapids, Iowa, where he will continue to make his headquarters.

The Dow Chemical Co., Midland, Mich., announces the appointment of Dr. William H. Schuette as general manager of the Midland division. He has served as assistant to the general manager since January, and prior to that was plastics production manager.

Minnesota Mining & Mfg. Co., St. Paul, Minn., has announced the appointment of C. C. March as general manager of the coated abrasives and related products division, and R. W. Mueller as general manager of the fibrous and industrial tape division.

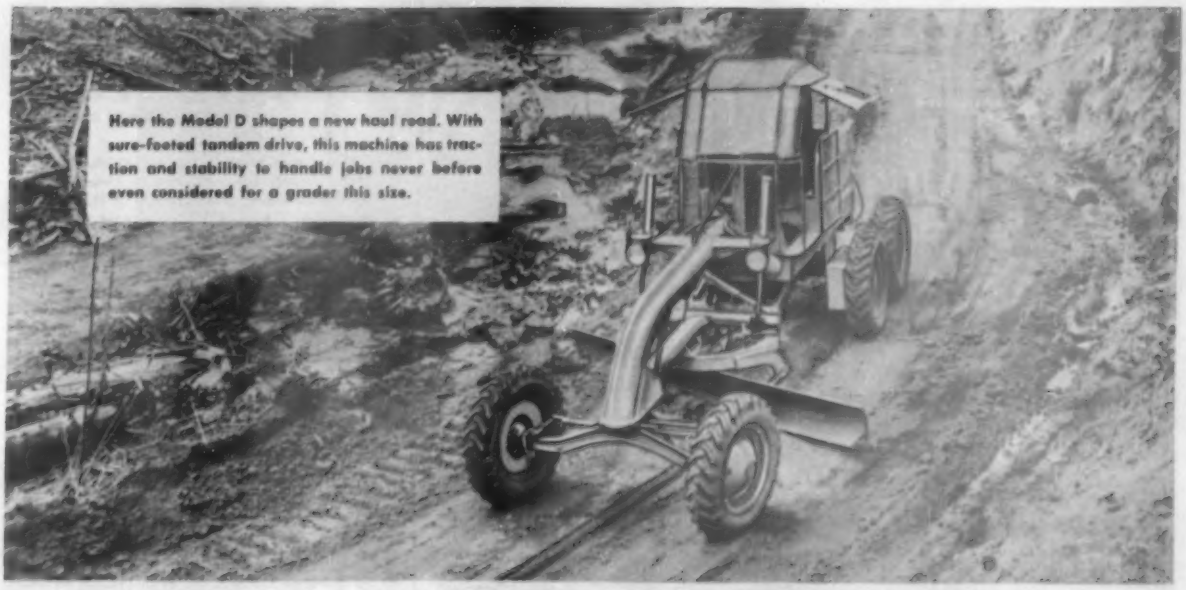
Equipment Corp. of America, Chicago, Ill., has consolidated its rebuilding facilities for construction and industrial equipment at Philadelphia and Pittsburgh, Penn., in order to better serve all territories, and has moved the Chicago offices to 327 S. LaSalle Street.

American Tractor Equipment Co., Oakland, Calif., has enlarged its plant facilities by expanding the fabricating and machine shop and assembly areas, as well as main offices and engineering and production control offices.

General Electric Co., Schenectady, N. Y., has opened a new apparatus service shop in New Orleans, La., with E. A. Woniger, Atlanta service shop specialist, as manager, under the direction of H. P. Hauck, manager of the Atlanta service shop.

Atlas Powder Co., Wilmington, Del., announces that eight chemistry and engineering students have been awarded $1000 Atlas Powder Co. scholarships for their senior year in college.

North American Philips Co., Inc., Research & Control Instruments Division, Mt. Vernon, N. Y., has announced the appointment of Philip I. Wolf as resident sales and application engineer for Oregon, Washington, California,



Here the Model D shapes a new haul road. With sure-footed tandem drive, this machine has traction and stability to handle jobs never before even considered for a grader this size.

Graded Haul Roads Increase Your Earnings

HAUL roads shaped and maintained with your own motor grader help step up output and cut costs on logging operations. Here's why:

1 Grader-maintained roads are smoother, better contoured—permit hauling units to make more trips per day.

2 Frequent grading eliminates ruts and potholes, cuts costly wear and strains on trucks.

3 Operations can proceed on schedule *in any weather* —graded roads drain fast, dry quickly.

And you get all these advantages . . . at the lowest possible cost with the Allis-Chalmers Model D.

First, it is built for the job, with all the features of a big grader — tandem drive, power hydraulic controls, fully visible blade, high-arch front axle, optional leaning front wheels, and power circle turn — yet costs only ⅓ as much as the large machines. It has the power, traction and balance to keep roads in really serviceable condition at far less cost than bigger, more expensive equipment.

The Model D is economical to own and operate — runs all day on a tank of gas. Even an inexperienced person can learn to run this machine in a surprisingly short time.

The Model D is available with a choice of gasoline or diesel engines. A full range of accessories include rear-end loader, scarifier, windrow eliminator, all-view cab, heavy-duty front tires, blade and V-type snowplows.

Write now for free catalog or see your Allis-Chalmers dealer for a demonstration.

WEIGHT: 8,800 lb.
BRAKE HP: 50

SPEEDS: Four forward to 25.6 mph
Reverse to 3.3 mph

ALLIS-CHALMERS

Here the Model D loads gravel from a hillside bed . . .

and carries it out to a soft spot in the haul road. This rear-mounted hydraulic shovel with ⅝-yd bucket loads dirt, stockpiles bulk material, etc.

FARREL-BACON JAW CRUSHERS

DESIGNED FOR *at least* 50 YEARS OF SEVERE CRUSHING SERVICE

The frame of a Farrel-Bacon jaw crusher is cast in one piece from Meehanite® metal to take the shock of prolonged and severe crushing service. At points of wear this frame is protected by parts which absorb any wear that might occur, and can be easily replaced at minimum cost.

Some of the places at which wear has been "designed out" are: (1) ROUND BACK—provides a machined seat for the fixed jaw plate and prevents damage to the main frame. (2) CHEEK PLATES—protect frame sides; made in two pieces for economical replacement. (3) FALSE CHEEK PLATES—hold cheek plates, and prevent wear on frame at this point. (4) SWING JAW SHAFT—pinned rigid in frame bearing to prevent wear on frame casting.

Many of the working parts are preserved similarly. The swing jaw has a replaceable wearing plate (5), and the main bearings (6) can be easily removed and rebabbitted in the shop.

Farrel-Bacon can help you lay out your plant as well as supply all necessary equipment from primary crusher to bin gate. Write for further details.

FARREL-BACON
Ansonia, Connecticut

BA-4

New Model E
ELECTRICALLY HEATED Leahy® Screen Offers Unheard of Efficiency

An entirely new jacket assembly and mounting concept now speeds and greatly simplifies difficult fine mesh screening of lime, eg-lime and silica sand.

The new construction vastly improves the electric heating circuit, reduces power consumption, eliminates "make and break" electrical connections to the jacket, simplifies screen jacket changes and tensioning, assures effective overall vibration for open mesh full capacity screening. Send for complete data.

Made by the Original Deister Co.
Incorporated 1906

The DEISTER CONCENTRATOR COMPANY
915 Glasgow Avenue, Fort Wayne, Indiana

Idaho, Montana, Nevada, Utah, Arizona, New Mexico, Colorado and Wyoming. He will make his headquarters in Burlingame, Calif.

The Cleveland Vibrator Co., Cleveland, Ohio, announces that L. P. Metsger, West Coast representative, has added the states of Idaho, Utah and Arizona to his territory.

Cedar Rapids Block Co., Dur-O-Wal Division, Cedar Rapids, Iowa, received an Award of Merit at the 24th annual convention of the National Advertising Agency Network, held recently in Monterey, Calif., for its advertisements carried in various publications during 1955.

H. K. Porter Co., Inc., Pittsburgh, Penn., announces that Thomas Mellon Evans, president, has been awarded the Parlin Memorial Award for "outstanding contribution to the field of marketing" by the Philadelphia chapter of the American Marketing Association.

Baldwin-Lima-Hamilton Corp., Lima, Ohio, has acquired 100 percent ownership of Madsen Iron Works, Inc., La Mirada, Calif., manufacturer of heavy road construction machinery, according to an announcement by George A. Bentschler, chairman of the board.

New York & New Jersey Lubricant Co., New York, N. Y., announces the appointment of Robert A. Henkel as sales representative in the Pittsburgh and western Pennsylvania territory.

The Thew Shovel Co., Lorain, Ohio, has appointed Ralph A. Reynolds as assistant treasurer in addition to his duties as credit manager. He has been with the firm for 35 years.

Gar Wood Industries, Inc., New York, N. Y., announces the appointment of William L. Davies as assistant to Walter C. Robertson, vice-president. He was formerly district representative for Athey Products Corp.

Caterpillar Tractor Co., Peoria, Ill., has announced formation of Caterpillar of Australia Pty. Ltd., a wholly-owned subsidiary, with Mark A. Clements of Peoria as managing director. J. Robert Hawk, now in Australia as a Caterpillar representative, will be sales manager.

SKF Industries, Inc., Philadelphia, Penn., has announced the election of Edwin R. Broden as executive vice-president. He was formerly executive vice-president and a director of the Carborundum Co., Niagara Falls, N. Y.

International Harvester Co., Chicago, Ill., has transferred Wayne E. Greene from New Orleans, La., to Chicago, Ill., as motor truck district sales manager. He replaces M. F. McCarty, retired, who has been district manager for the past 23 years.

Sterling Electric Motors, Inc., Los Angeles, Calif., announces the appointment of John R. Howell as vice-president in charge of sales. He has been with the firm for 27 years and formerly served as sales manager.

Worthington Corp., Harrison, N. J., has announced the appointment of J. H. Loomis as manager of the St. Louis office. He succeeds P. A. Mack, who has been appointed special representative.

Worthington Corp., Harrison, N. J., has announced the "Mixerama," a program of selling the Hi-Up mixer to ready-mixed concrete operators through on-the-job productive demonstrations.

Hewitt-Robins, Inc., Stamford, Conn., has established a new subsidiary, Hewitt-Robins (Netherlands) N. V., Amsterdam, Holland, with Alfred Cutler as manager and Edward P. Larsen in charge of engineering.

Manitowoc Engineering Corp., Manitowoc, Wis., has announced the following distributors: Dalton-Cooper, Inc., New York, N. Y., for various parts of Europe and the Orient; Compressed Air Equipment, Ltd., Toronto, Canada, for Ontario; Automotive Products Co.,

How AMSCO® helps you HARDFACE MORE EFFECTIVELY

The complete line of 15 Amsco hardfacing rods represents a selection of the toughest, hardest alloys available. Among the metals used for alloying are these highly wear-resistant elements—manganese . . . chromium . . . nickel . . . cobalt . . . tungsten . . . molybdenum. Each has particular resistance to certain types of wear—including impact, abrasion, heat, corrosion.

Your Amsco distributor has many helpful methods for selecting the proper hardfacing rod to most effectively combat types of wear you contact daily. *Make him your hardfacing headquarters.*

AMSCO CATALOG MAKES ROD SELECTION EASY

Write for the free catalog, *Amsco Hardfacing Alloys.* It presents complete analyses, metallurgical information and other pertinent data about Amsco's complete line . . . making it easy for you to look up the right rod to use in hundreds of common hardfacing applications. It is easy to understand and to apply the suggestions to your own operations. Send for it today.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

"THIS LUBRICANT KEPT 'EM ROLLING IN MUD, MUCK AND WATER"

—says J. O. ARCHIBALD
of Redwood City, California

The job was clearing 500 acres of salt marsh for crystallizing ponds. To quote, "We selected LUBRIPLATE No. 107 for track and general lubrication and LUBRIPLATE APG-140 for transmissions and final drives. During the entire job there was no replacements of track rollers nor any tie-ups of equipment due to parts replacement or breakage!"

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

Ltd., Montreal, for Quebec; Union Commercial Hispano Americana, S. A., Mexico, for the Republic of Mexico.

Simplicity Engineering Co., Durand, Mich., was recently presented a safety award in a contest sponsored by Michigan Mutual Liability Co., covering metal fabricating plants throughout the country, for its safety record in working 354,080 hours during 1954 with two minor accidents resulting in only 19 days lost time.

Bemis Bro. Bag Co., St., Louis, Mo., has announced reorganization of the Indianapolis sales division territory and the appointment of the following sales supervisors: U. E. Philpott in Indiana and Ohio; R. C. Thomas in Michigan; and F. H. Schardt in Kentucky. H. F. Wilson has been transferred from Detroit to Indianapolis to assist the sales manager on sales promotion activities, and E. G. Harvey, who was assistant sales manager, has been made Indianapolis plant merchandiser.

Eden Enterprises, Inc., Milwaukee, Wis., announces the appointment of John J. Stanwyck as executive vice-president and general manager of Eden Specialties Co., concrete products division of the company. He was formerly vice-president of Spray-O-Bond Co., Milwaukee, as was James Rose, who has been appointed sales manager. T. J. Koenig has been named director of advertising and public relations for products marketed on a national scale.

Chain Belt Co., Milwaukee, Wis., has announced the appointment of Horace A. Tennes as division manager of the Shafer bearing division, Downers Grove, Ill. Formerly sales manager, he succeeds Ray P. Tennes, retired, who has been actively connected with Shafer operations since 1923, and was president of the former Shafer Bearing Corp. John N. Tufts, assistant sales manager, succeeds Mr. Tennes as sales manager of the division.

Harbison-Walker Refractories Co., Pittsburgh, Penn., has announced the election of C. A. Brashares, general sales manager, as vice-president of sales, and A. Brent Wilson, assistant to the president, as vice-president of subsidiaries. W. C. Robinson, Jr., president of National Electric Products Corp., has been named a director.

Cummins Engine Co., Inc., Columbus, Ind., has announced the appointment of John W. Tucker as regional representative in Los Angeles, Calif., to succeed J. P. Jung, who has been made regional manager for the southeastern region with headquarters in Atlanta, Ga.

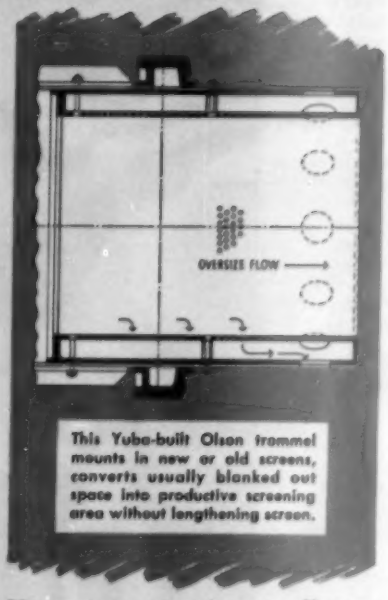
Peerless Pump Division, Food Machinery & Chemical Corp., Los Angeles, Calif., announces that Carl L. Nickel has been appointed product sales manager, water systems and dealer line products, and Norman C. Olson has been made product sales manager, engineered line products.

Bemis Bro. Bag Co., St. Louis, Mo., has appointed F. W. Ayers as sales manager of the Vancouver, Wash., multiwall bag plant. He was formerly sales manager for the multiwall department of the San Francisco plant. R. J. McDonald has been named sales manager for the packaging service department in Minneapolis.

Euclid Division, General Motors Corp., Cleveland, Ohio, has appointed the following distributors: Ray Long Equipment, Inc., Columbia, S. C., for the state of South Carolina; and Mitchell Distributing Co., Raleigh, N. C., for the state of North Carolina.

Koppers Co., Inc., Pittsburgh, Penn., has announced formation of a marketing department under the direction of Ralph Winslow, vice-president, which will include sections on sales management, market and economic research, sales personnel development, sales promotion, advertising and public relations. Other ap-

Here's Way To Increase Your Screen Capacity 25%



This Yuba-built Olson trommel mounts in new or old screens, converts usually blanked out space into productive screening area without lengthening screen.

Your screen capacity actually can be increased as much as 25%—without adding to the screen length—by mounting Yuba-built Olson trommels inside your present screens.

Olson patented trommels convert screen space usually blanked out by tread rings and end plates into productive screening area. Plates are taper drilled with holes of size and spacing suited to your requirements. Effective screening is thus extended to full length of your screens. You can get better classification of material, too, through additional perforated area. Effectiveness and freedom from downtime proved by more than five years of field use.

For your present screens or for new ones, Olson trommels, made of abrasion resisting steel plate to fit your needs, can be either field or factory installed. Send details and general arrangement of your screen, hole sizes and spacing needed. Estimates furnished promptly; no obligation.

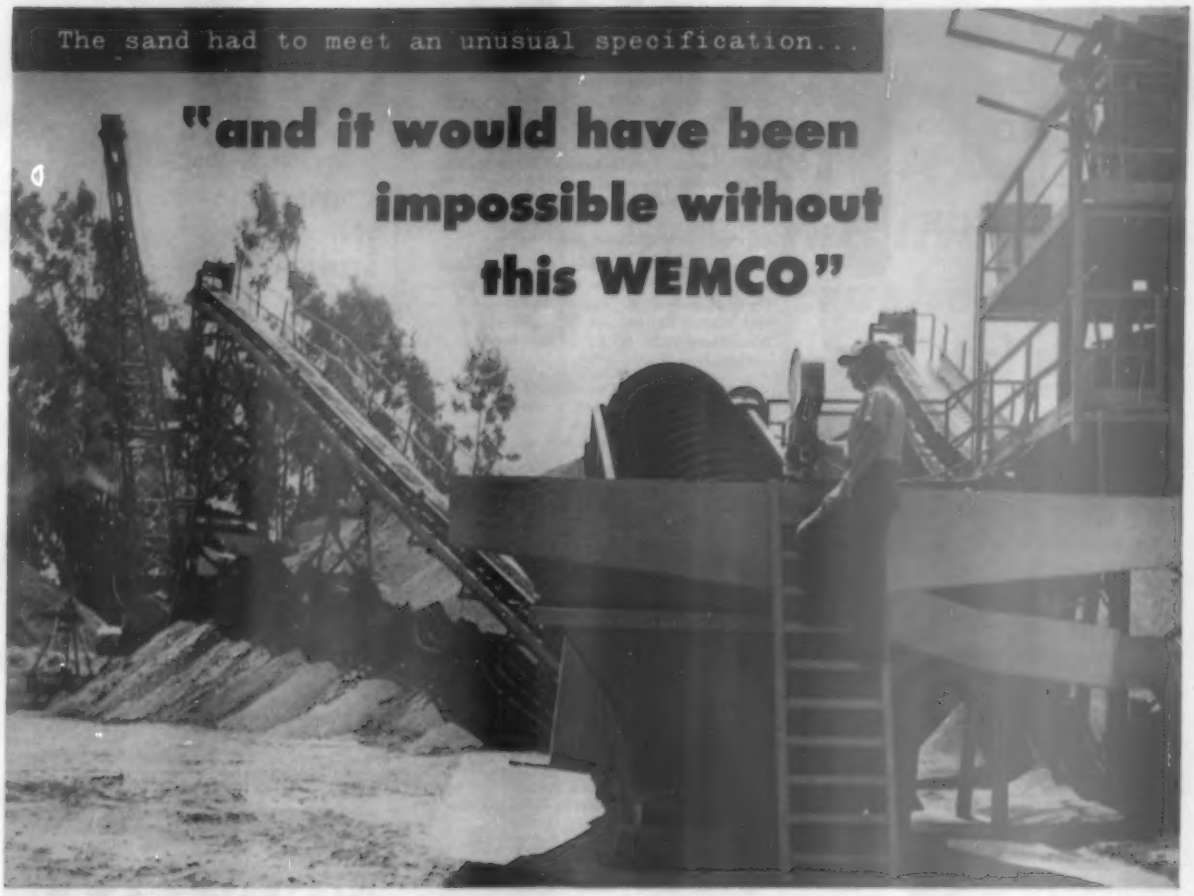
YUBA OREGON

92

YUBA MANUFACTURING CO.
Room 650 • 351 California St. • San Francisco 4, Calif.

The sand had to meet an unusual specification...

"and it would have been impossible without this WEMCO"



When the Niles Sand and Gravel Company got the sand and aggregate order for the Ford Motor Company's new assembly plant in Milpitas, California, it was on the basis of an exceptionally rigid sand requirement. It has now been successfully fulfilled, and H. G. Clouser, Niles plant superintendent, reports, "this would not have been possible except for the adaptability of our 60-inch Wemco Sand Preparation Machine".

With 60,000 yards of concrete being poured on this one Ford plant, the fineness modulus was not permitted to vary more than 0.2%. Plus 200 mesh fines had to be retained in correct proportion and – 200 mesh had to be eliminated as completely as possible. A continuous materials testing program was under the direction of Hales Laboratories of Oakland.

After his experience on these very exacting requirements, Mr. Clouser of Niles Sand and Gravel Company states, "I believe that the Wemco Sand Preparation Machine, intelligently used, can meet practically any desired sand specification." "It has proven particularly adaptable to various operational changes we have made." "The hydraulic screw lift makes it readily adjustable to day-to-day pit variations." "And it has been one of the most troublefree pieces of equipment in our plant (three years running on its original wear shoes)."

For descriptive literature, write Dept. J-2442.

Plant operator Tom Brannon using the hydraulic spiral lift. This simple adjustment compensates day-to-day pit variations, and in locations where freezing is a problem may also be used to break surface ice (eliminating the need for draining the tank for overnight shutdown).

WEMCO®
WESTERN MACHINERY COMPANY

760 FOLSOM STREET • SAN FRANCISCO 7, CALIF.

Representatives in principal cities of the United States and Canada and in major countries throughout the world.

SAND AND GRAVEL PUMPING CAN BE PROFITABLE

get the facts FREE

Perhaps you've just hit water and are trying to decide whether or not to pump. And, if so, what pump to use.

Or maybe you've been pumping for years but are beginning to question the efficiency of your present installation.

In either case, our experienced hydraulic engineers stand ready to help you . . . absolutely without obligation.

They will ask you to furnish certain basic information about your deposit, location, pumping distance, etc. From this information they will prepare a detailed analysis for you . . . an analysis and recommendation upon which you can make a sound judgment in selecting and installing your equipment.

Take advantage of this *free* service —today! Tear out the coupon and mail it. It may be worth a great deal of money to you.

AMSCO® DIVISION

American Brake Shoe Company

Chicago Heights, Ill.

Amsco Division (Pump Department)
Chicago Heights, Ill.

I want a *free* analysis without obligating myself. Send all information to:

Name_____

Title_____

Company_____

Address_____

_____

appointments include Cooke Bauman, Jr., assistant to general manager of chemical division; George W. Naylor, manager of international department of chemical division; and Harry P. Neher, assistant sales manager of tar products division.

General Refractories Co., Philadelphia, Penn., announces the appointment of Drew M. Thorpe as executive vice-president, and Lee A. Diehl as vice-president and controller. George R. Rittenhouse succeeds Mr. Diehl as assistant secretary and assistant treasurer.

The Galion Allsteel Body Co., announces the appointment of Acme Spring & Equipment Co., Charleston, W. Va., as distributor in central West Virginia, and V. W. Weeks & Sons, Inc., Glens Falls, N. Y., as distributor in east-central New York.

Nopco Chemical Co., Harrison, N. J., has opened a new office and warehouse in Portland, Ore. John J. Ryan continues as industrial sales representative for the Northwest.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces that four motorized field training units have been placed in service by the tractor division. A unit with a two-man crew has been assigned to each of the industrial sales and service territories.

Hewitt-Robins, Inc., Stamford, Conn., announces that Harold Von Thaden, vice-president and general manager of the international division, is visiting subsidiary and affiliated companies in England, Italy, South Africa, Holland and France to meet with management officials.

Atlas Powder Co., Wilmington, Del., announces that its eastern district explosives sales offices have been moved from New York to Wilmington, Del., and that the eastern district sub-office at Tamaqua has been moved to Wilkes-Barre, Penn.

International Paper Co., New York, N. Y., has opened a new branch sales office in Denver, Colo., where Russell A. Gair, Jr., will continue to represent the Bagpak division; Bryan J. Smith the container division, and Edwin B. Williams the single service division.

Bemis Bro. Bag Co., St. Louis, Mo., has announced the appointment of L. A. Linville as assistant director of sales in the absence of C. W. Akin, who is temporarily assigned to plastic bag development. A. B. Williams, formerly sales manager, succeeds Mr. Linville as manager of the Multiwall paper bag plant at Vancouver, Wash.

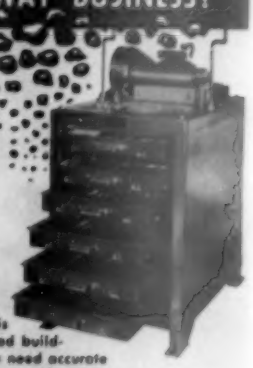
Pangborn Corp., Hagerstown, Md., manufacturers of blast cleaning and dust control equipment, announces that Charles Bultman has been placed in charge of sales promotion of new blast equipment. He was formerly Detroit district sales manager and will be succeeded by David Bair, assistant to Mr. Bultman for the past 14 years.

Sika Chemical Corp., Passaic, N. J., has opened a branch office in Washington, D. C., with A. T. Rogers as district manager. Mr. Rogers has had over 30 years' experience in concrete design and construction.

Farrel-Birmingham Co., Inc., Ansonia, Conn., announces the election of Franklin Farrell III as president of the company. He succeeds Franklin B. Hoadley, who has retired. Alton Austin Cheney was re-elected chairman of the board and Austin Kuhns, chairman of the finance committee. New vice-presidents are Edward S. Coe, Jr., Robert M. Honegger, and Joseph LeMay.

General Motors Corp., Detroit Diesel Engine Division, Detroit, Mich., has appointed the following representatives: G. R. Holly, sales representative, covering Arizona, New Mexico and Utah; Stanley Partel, sales representative, covering North Dakota, South Dakota, Minnesota and eastern Iowa; K. L. Post, service

Get the HIGHWAY BUSINESS!



CONTROL your SIZING with GILSON

To get in on this year's record road building business you need accurate control of sizing specifications. The GILSON Mechanical Testing Screen cuts out error and guesswork in complying with sizing requirements for crushed stone, gravel, slag, coal, ores and similar materials — guarantees that every load is as ordered.

Write now for information

Here's why you want GILSON—

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5. Visible separation to refusal
6. Few moving parts
7. Sturdy construction
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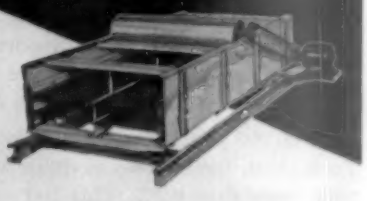
For Research Projects, too—the GILSON Screen is the answer to moderate-scale mass separation jobs.

GILSON SCREEN CO.
MALINTA, OHIO

UNIVERSAL
OFFERS THE BEST IN VIBRATING SCREENS AT THE LOWEST PRICE



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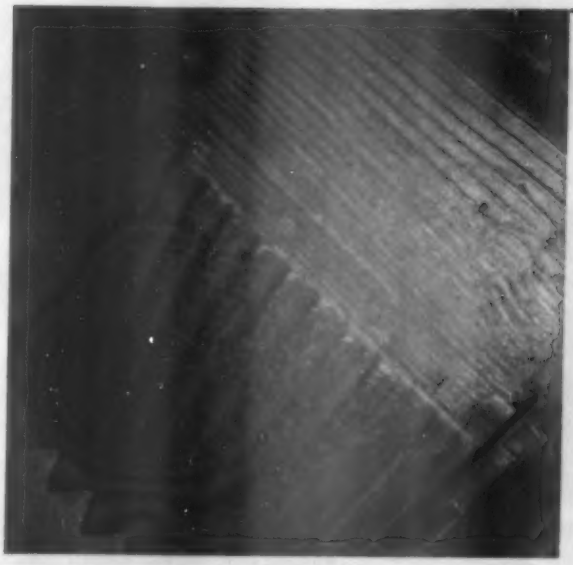
There's a model to fit your particular requirement, priced within the smallest budget.

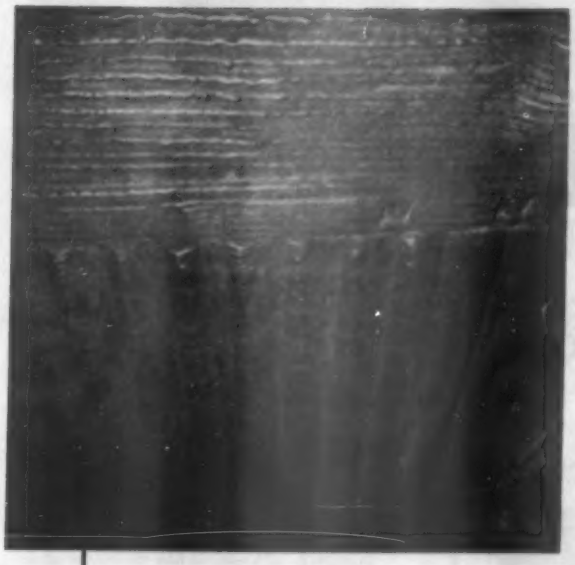
Write today for free catalog #150 I

UNIVERSAL VIBRATING SCREEN CO.
Racine, Wisconsin
Quality Screens Since 1919



how to EXTEND working life of jaw crushers

apply VICTOR HARDFACING



No Disassembly This jaw crusher was hardfaced with jaws bolted in place, using 3/16" coated Tube Victorite. Despite cramped working area only 12" deep and 36" wide, high deposition rate and low spatter loss enabled welder to get uniform, non-sagging, long-wearing bead without distorting jaw.

Downtime Saver Because it goes on fast, without flux interference, and sets up quickly, coated Tube Victorite is wonderful for hardfacing on the job without disassembly of equipment.

Where To Use Coated Tube Victorite is a high alloy content rod with Rockwell C hardness of 55-58. It was developed specifically for tools subject to severe abrasion and impact, such as:

- Ripper Teeth
- Pug Mill Augers
- Jaw Crushers
- Roll Crushers
- Die Rings
- Tool Joints
- Scraper Blades
- Asphalt Mixer Paddle Shanks
- Mill Hammers
- Bucket Lips

It welds easily to carbon alloy and manganese steels—the latter frequently is used for buildup before applying coated Tube Victorite. It can be used for position welding. Deposit is smooth, even, free of pin holes. Made for AC and DC (reverse polarity) application.

Free Help—Victor hardfacing manual shows you the right rod to use and how to apply it. Ask your Victor dealer for manual and descriptive leaflets on Tube Victorite and other Victor rods . . . or write us.

Profitable dealerships open; inquire now!

VICTOR for hardfacing

VICTOR EQUIPMENT COMPANY
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TY-ROCK SCREENS

BALANCED RUGGED

4' x 12', two surface
Type F-600 Ty-Rock Screen

THE W. S. TYLER COMPANY
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Manufacturers of Woven Wire Screens and Screening Machinery

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REMOVES
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Improve your sand or gravel specifications at a low cost per ton. Of compact design, the Meckum Jig separates low from high specific gravity materials with a positive water and mechanical action.

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representative in Colorado, Montana, Nebraska and Wyoming; Vance Shields, service representative in northern Illinois, Michigan and Wisconsin; and R. A. Stephens, service representative in western New York, Ohio, western Pennsylvania and West Virginia.

Baldwin-Lima-Hamilton Corp., New York, N. Y., has announced the appointment of Robert B. Murray, Jr., as special assistant to the president, with headquarters in Philadelphia, Penn. Mr. Murray recently resigned as Under Secretary of Commerce for Transportation in Washington, D. C.

Barber-Colman Co., Wheelco instruments division, Rockford, Ill., announces the appointment of the R. H. Witthold Co., Houston, Texas, as sales representative in the Houston area, and Swiceo, Inc., Fort Worth, Texas, in the Fort Worth area.

Chain Belt Co., Milwaukee, Wis., has announced plans to expand its Shafer bearing division plant in Downers Grove, Ill.

Euclid division, General Motors Corp., Cleveland, Ohio, has appointed the Evans Engine & Equipment Co., Seattle, Wash., as sales representative in western Washington and the Territory of Alaska. General Diesel & Equipment Co., Williston, N. D., has been named distributor for North Dakota and Clay county in Minnesota.

Detroit Bevel Gear Co., Detroit, Mich., has announced the appointment of William Taylor as assistant to the president. He was formerly purchasing agent.

The Colorado Fuel & Iron Corp., New York, N. Y., has announced an improvement program for the Wickwire Spencer division plant in Buffalo, N. Y., which is now under way.

Allis-Chalmers Mfg. Co., Milwaukee, Wis., has announced the election of Harold M. Schudt as president of Canadian Allis-Chalmers Ltd. He succeeds Mark C. Lowe who has resigned. Mr. Schudt has been associated with Allis-Chalmers since 1929.

Bay City Shovels, Inc., Bay City, Mich., announces the election of Frank A. Phillips, director of sales, as vice-president in charge of sales, and Arthur W. Reidinger as secretary in addition to handling advertising and sales promotion.

Le Roi Division, Westinghouse Air Brake Co., Milwaukee, Wis., announces the appointment of Glenn W. Graf as manager of sales promotion. He succeeds Richard H. Koehler who was recently appointed director of advertising and publicity.

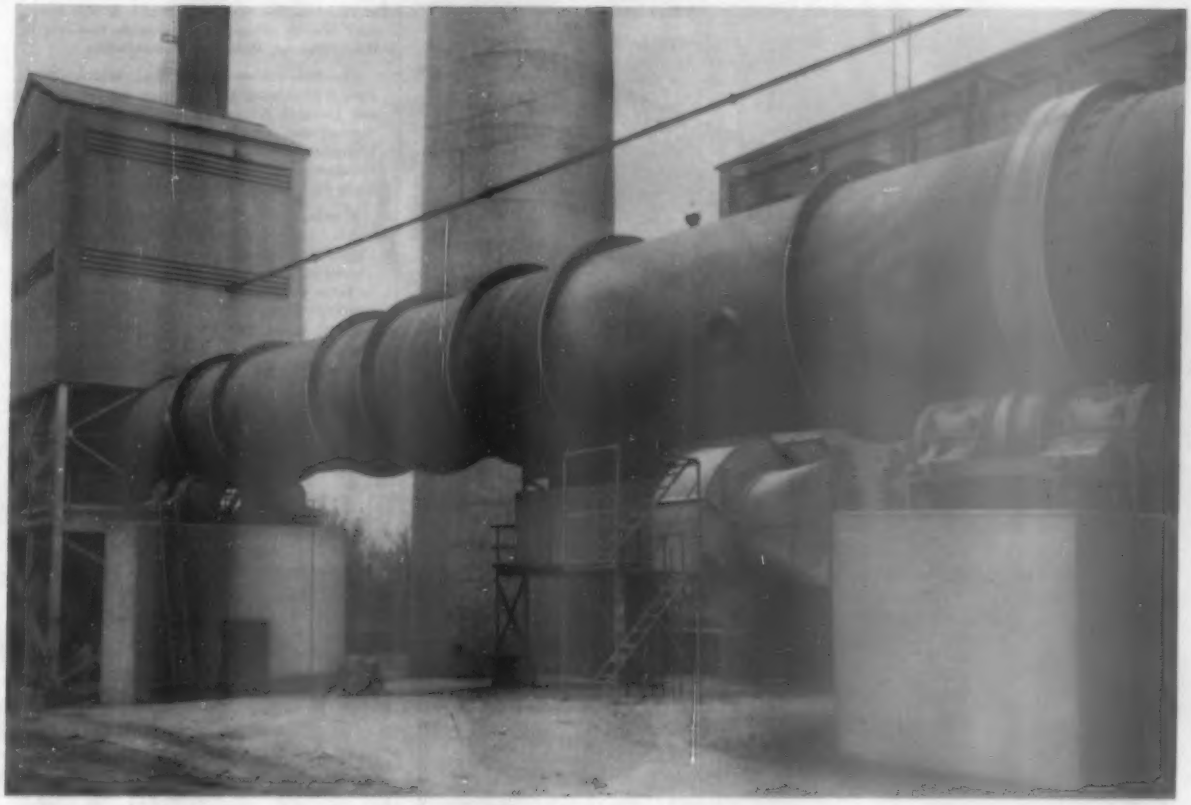
The Lincoln Electric Co., Cleveland, Ohio, has announced the appointment of L. K. Stringham as vice-president in charge of engineering, and George Landis as vice-president in charge of research.

Marmon-Herrington Co., Inc., Indianapolis, Ind., has elected Guy C. Dixon as vice-president in charge of finance, and John H. Gant as treasurer, in addition to his duties as assistant secretary.

Huber-Warco Co., Marion, Ohio, has appointed the following distributors: R. G. Moeller Co., Detroit, Mich.; Caird Engineering Works, Helena, Mont.; The Sawtooth Co., Boise, Idaho; and The Bode-Finn Co., Cincinnati, Ohio.

Aeroquip Corp., Jackson, Mich., has announced acquisition of Marman Products, Inc., Los Angeles, Calif., manufacturers of the Marman clamp and related products, such as flexjoints, valves and strainers.

Barber-Colman Co., Rockford, Ill., announces the following appointments in the Wheelco Instruments division: H. V. King, formerly of the Chicago office, has been transferred to the Philadelphia office, and Harold Sieber has joined the staff. D. Combellack, formerly with the Detroit office, is now located



Over 55,000 feet of Rotary Kiln Installations are a proving ground that benefits future Traylor Customers

Traylor has averaged almost 1 Rotary Kiln installation a month for the past 14 years. They are being used to process over 20 different products.

A great number of these Traylor Kilns are operating in the limestone and cement producing industries. From this concentration of effort, Traylor has naturally become thoroughly familiar with the many thermo-processing problems connected with limestone and cement production.

Drawing on this experience, Traylor has developed many advanced Rotary Kiln design features contributing to low cost, trouble free calcining of lime and cement. By now, all these features have been thoroughly proved on the proving ground represented by Traylor's 55,000 feet of Kiln installations.

Every Traylor Kiln is individually "Traylored" for its special jobs. Sizes have been built ranging from the smallest up to 12′ in diameter by 450′ in length.

Bulletin #1115 will tell you all about the profit-producing advantages of a "Traylor-Made" Kiln. Send for your copy today.

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1725 MILL ST., ALLENTOWN, PA.
SALES OFFICES: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

A Traylor leads to greater profits

These four 30′ x 60′ silos are used by a pulp and paper mill for handling and storing wood chips.

We have erected silo-type bins at hundreds of plants to handle and store bulk materials peculiar to their industries. A few examples are—grain for the milling industry; clay, silica sand, and feldspar for the ceramic industry; ore for the metal industries; molding sand for the foundry industry; cottonseed and soybeans for the vegetable oil industry.

Designing handling and storage systems for around 100 kinds of materials has given us a wealth of experience which is at your disposal. You are invited to write, wire, or phone us.

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THE NEFF & FRY CO.

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SUPER-CONCRETE STAVE STORAGE BINS

GYROSET VIBRATING SCREENS FOR

SIZING — DEWATERING

POSITIVE ECCENTRIC ACTION
POSITIVE STROKE ADJUSTMENT

WITH ONLY 2 BEARINGS

For scalping and for raw material sizing. A rugged two bearing positive eccentric screen. Adjustable as to stroke from 0 to 5/8" for efficient economical service.

PRODUCTIVE EQUIPMENT CORP.

2926-28 W. LAKE ST. CHICAGO 12, ILL.

at Atlanta, Ga. Henry Hoffman of the Cleveland branch office, has been made manager of the Columbus, Ohio, sub-branch office.

The Babcock & Wilcox Co., Beaver Falls, Penn., announces that its new quality control and research laboratory is now in full operation at the tubular products division plant. Equipment includes two production control quantometers for determining composition of steels by spectrographic methods.

Westinghouse Electric Corp., Pittsburgh, Penn., announces that the Schneider Mfg. Corp., Muncie, Ind., a wholly-owned subsidiary, purchased in October, 1954, has been dissolved to form the hydraulic drives department of the gearing division. S. M. Johns has been appointed sales manager for the new department; T. P. Dunkin, manager of manufacturing; and P. L. Fosburg, engineering manager.

Syntron Co., Homer City, Penn., announces that C. W. Ramsley has been appointed manager of the rectifier department. He was formerly sales application engineer in the selenium rectifiers and will be succeeded by James Scott.

Hemsley Equipment Co., San Leandro, Calif., has appointed the Keremi Tractor & Equipment Co., Cheyenne and Casper, Wyo., as distributor in Wyoming and western Nebraska.

The Hays Corp., Michigan City, Ind., has announced the appointment of Robert E. Navin as assistant to the executive vice-president. For the past six years he has served successively as special projects engineer, chief engineer and assistant to the president of the Detroit Bevel Boar Co., Detroit, Mich.

Twin Disc Clutch Co., Racine, Wis., has announced the appointment of Jack N. Yetter as sales manager of the general products division. He succeeds E. C. Billings who has retired but continues in a consulting capacity. Mr. Yetter was formerly sales promotion manager at Racine, Wis.

Fairbanks Morse & Co., Chicago, Ill., announces the appointment of John C. Elmburg, formerly manager of the Portland, Ore., branch, as assistant general sales manager. He succeeds Harry L. Hilleary who has retired. William F. Wahlemaier, formerly electrical department manager, succeeds Mr. Elmburg as Portland branch manager.

Lincoln Engineering Co., St. Louis, Mo., has announced the appointment of Robert E. Crean as manager of the Philadelphia industrial branch sales office, succeeding M. C. Hazenfield who has retired. John E. Renner, general sales manager, has been named vice-president in charge of sales, and Carl H. Mueller, director of engineering, has been appointed vice-president in charge of engineering.

St. Regis Paper Co., New York, N. Y., announces that Justin H. McCarthy, chief engineer of the pulp and paper divisions, has been named vice-president. He will continue to make his headquaters in Jacksonville, Fla.

H. K. Porter Co., Inc., New York, N. Y., has announced the appointment of James H. Joyner as manager, Pacific Coast sales, Quaker Pioneer Rubber Mills, San Francisco, Calif. He has been associated with Quaker Pioneer as manager of the Los Angeles branch since acquisition by H. K. Porter Co. in 1954.

Flexible Steel Lacing Co., Chicago, Ill., has appointed Donald J. Beach as sales representative in Michigan, Indiana and western Kentucky.

The Jeffrey Mfg. Co., Columbus, Ohio, has opened a new district office in Raleigh, N. C., under the management of J. R. Brisley, who was formerly manager of the Baltimore office.

Chain Belt Co., Milwaukee, Wis., has appointed Charles R. Angell as district manager for the West Coast operations.

AIR AT WORK

New two-stage Ro-Flo compressor provides constant efficiency... cuts maintenance

Efficiency and air supply are constant year after year with *Ro-Flo* compressors. Even if wear occurs, it is automatically compensated for, so that air supply is unaffected.

In addition, rotary design eliminates practically all vibration. No heavy foundations are needed.

Maintenance is cut too! There is no wear and tear from shock and vibration . . . no hard-to-maintain pistons and valves.

For constant efficiency . . . overall savings on air, modernize air supply with two-stage *Ro-Flo* compressors.

GET THE FACTS: Contact your A-C office or write Allis-Chalmers, Milwaukee 1, Wis.

Ro-Flo is an Allis-Chalmers trademark.

Two-stage Ro-Flo compressors in pressures from 60 to 125 pounds gauge, and volumes from 250 to 1800 cubic feet per minute. Single-stage units for lower pressures.

A-4738

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In plants handling Cement, Lime, Gypsum, Sand, Gravel, Crushed Stone, etc. the WEIGHTOMETER is used for fast accurate production.

WEIGHTOMETER gives a continuous, automatic, and accurate weight record of materials in transit at an extremely low operating cost. All producers of bulk materials handled by belt conveyors need this dependable check on production figures supplied by MERRICK WEIGHTOMETER.

Merrick Scale Mfg. Co.
Passaic, New Jersey

Lone Star Expansion Program

A MAJOR EXPANSION PROGRAM has been announced for the third time in 1955, by H. A. Sawyer, president, Lone Star Cement Corp., New York, N. Y. The project is expected to cost approximately $35,000,000, bringing the total cost of the company's current program to $57,000,000, with an increase in capacity of 10.2 million bbl. of cement annually. This latest expansion program includes enlargement of cement plants at Dallas and Houston, Texas, and Hudson, N. Y., and the building of a new cement plant, costing about $14,000,000, on the Calcasieu River, south of Lake Charles, La. The entire program is expected to be completed in late 1956, bringing the capacity of the Lone Star system as a whole to a total of 44.5 million bbl. of cement annually.

The new plant, with an expected capacity of 2,000,000 bbl. of cement annually, is being built on a 350-acre site located midway between the plants at New Orleans and Houston. Scheduled for completion in late 1956, the plant is being designed to accommodate shipment by water as well as rail.

The 250 ft. long main raw material storage building and adjoining mill building are to be constructed entirely of reinforced concrete with a 77-ft. clear span concrete arch roof between the walls, without intermediate supports. The mill building will house a battery of raw and finish grinding equipment powered by 1000-hp. motors. In the raw mill, material will be ground to a fineness permitting 90 percent to pass through a 200 mesh sieve. The raw mix will be transported by pneumatic conveyors to the raw mix silos consisting of eight units, each 22 ft. in dia. by 80 ft. high. These silos serve as storage and blending tanks, and from here the raw mix is drawn out and delivered to the feed end of two 11 ft. 3 in. x 450 ft. kilns. Two large overhead cranes will travel the full length of the storage building, which will be arranged so that material of various kinds can be mixed and moved into bins feeding the finish mills.

Dust filters and electrical precipitators will be installed throughout the plant. A separate building will house a large machine shop equipped for repair work, as well as a supplies and parts storeroom. An employes' service building is also being built.

Capacity of the cement plant at Dallas, Texas, will be increased by 50 percent, or 1.4 million bbl. annually, to a total annual capacity of 3.7 million bbl. The program calls for installation of two additional kilns, as well as grinding equipment and auxiliary structures. Electrical dust collectors will be installed in connection with the new kilns, as well as the four present kilns. Additional limestone deposits are also being acquired on a 746-acre site located 4½ miles from the plant, estimated to contain sufficient supply for the manufacture of 300,000,000 bbl. of cement.

Enlargement plans for the Houston, Texas, cement plant provide for an increase in capacity by over 50 percent, or 1.1 million bbl., to a total of 3.2 million bbl. annually. Included are the installation of a third kiln, together with additional raw and finish mills, clay-handling and storage equipment, slurry basin, and related installations.

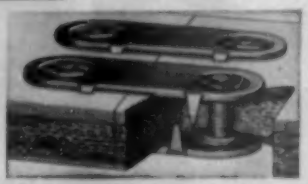
At Hudson, N. Y., the cement plant capacity will be increased by 50 percent, or 1,000,000 bbl. to a total annual capacity of 3,000,000 bbl. The expansion program calls for installation of fifth kiln and cooler, dust collectors, a new crushing plant, raw and finish grinding mills, coal-handling system, raw storage and power plant extensions, and other related installations and structures. The program was planned to maintain full-scale production during the enlargement.

FLEXCO®

BELT FASTENERS and RIP PLATES

FOR HEAVY CONVEYOR AND ELEVATOR BELTS OF ANY WIDTH

★ FLEXCO Fasteners make tight butt joints of great strength and durability.
★ Trough naturally, operate smoothly through take-up pulleys.
★ Distribute pull or tension uniformly.
★ Made of Steel, Monel, Stainless, Everdur. Also Promal top plates.
★ FLEXCO Rip Plates are for bridging soft spots and FLEXCO Fasteners for patching or joining clean straight rips.

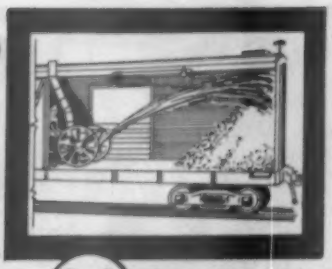


Compression Grip distributes strain over whole plate area

Order From Your Supply House. Ask for Bulletin F-100

FLEXIBLE STEEL LACING CO., 4684 Lexington St., Chicago 44, Ill.

LOAD AND TRIM BOX CARS *FASTER, CHEAPER..*



with S-A BOX CAR LOADERS

S-A Loaders and Pilers will SAVE YOU MONEY with every car you load. One man, working part-time can load and trim up to 150 tons per hour of granular material up to 2" lump size.

PRICED AS LOW AS $762.00 F.O.B. AURORA

IN STOCK... FOR IMMEDIATE DELIVERY

WRITE TODAY FOR COMPLETE INFORMATION

STANDARD PRODUCTS DIVISION

STEPHENS-ADAMSON MFG. CO.

7 Ridgeway Ave. Aurora, Illinois

THOUSANDS

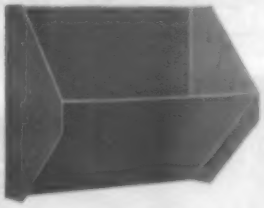
OF HOURS OF DEPENDABLE OPERATION AT LOWER COST

- SELF CLEANING
- STRONG REINFORCED WELDED CONSTRUCTION
- LOW COST

STANDARD WING TYPE SELF-CLEANING PULLEY

So strong it can withstand the most punishing loads without flinching because its all-steel welded construction gives it far greater strength with less weight at lower cost.

CONTINUOUS ELEVATOR BUCKET STYLE No. 2



Built to take the hardest use you can give it and come back for more, this bucket is typical of the complete line of low cost, rugged Standard Steel Buckets — available in Salem, Style "A," shelf type and other continuous style buckets.

STANDARD BIN GATE

Speed material handling with this Standard gear-operated bin gate, which has all-steel welded construction. Other styles in Standard Bin Gates also available.

Slash material handling costs by converting to Standard. Write today for catalog showing the complete Standard line.

STANDARD METAL MFG. CO.

110 CENTER ST. MALINTA, OHIO

McNP

DESIGNERS and BUILDERS of EQUIPMENT for BASIC INDUSTRIES

Elevators

McNally Pittsburg builds bucket elevators for severe service. They are designed, fabricated and installed to handle all types of bulk materials. When you need rugged bucket elevators, write to McNally Pittsburg.

INDUSTRY SERVICES
Research & Development
Engineering Design Field Erection

INDUSTRY EQUIPMENT

Bucket Elevators	Conveyors
Car Hauls, Dumpers	Pug Mills
Pumps, Valves, Piping	Crushers
Dryers, centrifugal & heat	Screens
Washers, heavy media & jig	Kilns

McNALLY PITTSBURG MANUFACTURING CORPORATION

OFFICES: 307 North Michigan, Chicago, Illinois
First National Bank Bldg., Pittsburgh, Pa.

PLANTS: Pittsburg, Kansas Wellston, Ohio

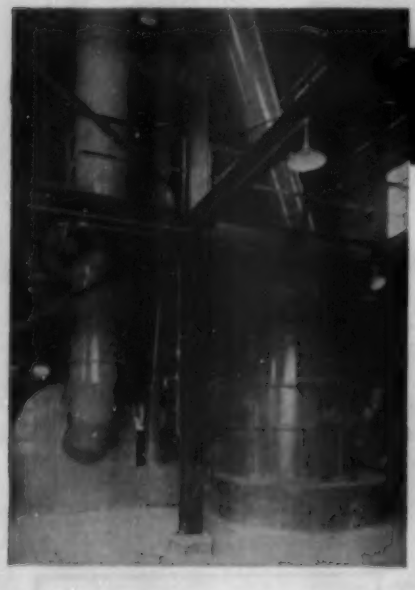
Before and After Applying MANGA-TONE N.M. and RESISTO-LOY

This rebuilding job on Gyratory Liners was accomplished economically despite the fact that well over an inch of deposited metal was required all around the bottom third. Note the very badly worn areas in the "before" picture. Then note the perfectly done, finished job.

This rebuilding was done by the plant maintenance welder, using our Manga-tone N.M. to rebuild the liner and making the last pass over the lower 15 inches with Resisto-Loy. This final coating pays a fine dividend in additional wear resistance.

Why not put in a call for our field man? He can show you many ways to save materials and money.

THE RESISTO-LOY CO., INC. - Grand Rapids 7, Michigan



when *fine* grind is desired

BRADLEY
PNEUMATIC HERCULES MILL

The ONLY pneumatic roller mill installed at floor level.

Designed and constructed for FINE grinding of limestone, phosphate rocks, and many other similar materials . . . Bradley Pneumatic Hercules Mill produces a uniform grind from 20 to 325 mesh. Floor level installation provides easy accessibility . . . lowest installation and maintenance cost. Durable, non-clogging vibratory feeder for dependable, worry-free operation. Material with excessive moisture can be dried within the mill system.

For complete information, write for Catalog No. 62

Bradley PULVERIZER CO.

LONDON ALLENTOWN, PENNA. BOSTON

Rotary

DRYERS
COOLERS
KILNS

Increase the capacity and efficiency of your plant

McDERMOTT BROS. CO.

THIRD AND WASHINGTON STS.
ALLENTOWN, PENNA.
Established 1895

CUT TIME AND LABOR COSTS

on "secondary breakage"

with FREDERICK CAST semi-steel DROP BALLS

Eliminate costly, time-consuming drilling or blasting with this low-cost production tool. Rugged, durable Frederick Drop Balls provide you with quick, easy crushing power where you want it—when you want it, with little or no maintenance. Frederick's exclusive "pear-shaped" design withstands greater impact and gives straighter "pin-point" drops. Exclusive "E-Z Swing" steel eye is recessed to prevent excessive ball movement and keep hook in place. Nickel alloy is standard on balls 4000 lbs. or over—or, we'll be glad to quote on special alloys if desired.

Balls can be furnished with replaceable pins, if requested. Special release hooks for free dropping are also available.

Write today for prices and illustrated literature; send order direct or telephone.

	Wide Range of Sizes and Weights:						
Pear shape (lbs.).....	1500	2000	3300	4000	5200	6500	8000
Ball shape (lbs.).....	500	1000	2000	5200			
Spherical shape (lbs.)..... (for magnet use)	470	930	1650	2400	3000	3700	5400

FREDERICK IRON & STEEL, INC.
FREDERICK *Established 1890* MARYLAND
Phone: MOnument 3-5111

CENTRIFUGAL PUMPS • MUNICIPAL AND GRAY IRON CASTINGS

Choice of 304 different buckets for Rehandling, Wide Rehandling, General Purpose, Hard Digging or Dredging

Why such a big choice?

So you can have the bucket that will fit your job whether it's rehandling sand or large pieces of limestone.

So it will fit your crane whether it's a small truck-mounted type or a big crawler.

So it will fit your present cable.

All these add up to 304 different possible combinations.

To select the proper size, weight and type bucket for the most efficient and profitable operation of your crane usually requires the service of a competent distributor's or manufacturer's sales engineer.

See your nearest Blaw-Knox distributor today.

Send for **BULLETIN 2254-R1**

BLAW-KNOX COMPANY
BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh 38, Pa.
Offices in Principal Cities

BLAW-KNOX CLAMSHELL BUCKETS

AUTO VORTEX CLASSIFIERS...

MOST EFFICIENT BY ANY MEASURE FOR SINGLE OR MULTIPLE SPLITS!

COMPARE RESULTS . . . COMPARE COSTS . . . AGAINST ANY OTHER SAND GRADATION EQUIPMENT! AFTER SUCH COMPARISON, YOU, TOO, WILL BUY AUTO-VORTEX CLASSIFIERS . . . WHATEVER YOUR SPECIFICATIONS . . . WHATEVER YOUR PROBLEMS!

WRITE FOR OUR BULLETIN No. 81!

PATS. PEND.

CHARLES E. WOOD COMPANY

906 NORTH WATER ST. • MILWAUKEE 2 WISCONSIN

GAYCO CENTRIFUGAL SEPARATORS

GAYCO BRINGS YOU All These!

- Range 60 to 400 mesh
- Greater Capacity
- 25 to 30% greater production
- Cleaner Tailings
- Uniform Products
- Slow speed for slow wear
- Quick and easy adjustments

"TIMKEN BEARING EQUIPPED"

If you have an exceptionally hard separating problem, TRY THE GAYCO.

Closer separations are possible with the Exclusive Gayco Centrifugal sizing fan. Higher production results from a more complete removal of the fines made by the mill. The efficient Gayco sizing eliminates all undesirable oversize from the product.

UNIVERSAL ROAD MACHINERY CO.

Rubert M. Gay-Division

Factory and Laboratory, Kingston, N. Y.

117 LIBERTY STREET NEW YORK 6, N. Y.

Canadian Representative: F. H. Hopkins & Co., Ltd.

8300 Decarie Blvd., Montreal, Que.

You'll Vote For

X KLEENSLOT WEDGE WIRE SCREEN

Everytime

The ideal screen for dewatering, sizing and cleaning operations. They can be adapted to fit any make of vibrator. You do not have to change your present machine to accommodate KLEENSLOT screens. They are of quality construction and their rigidity and method of installation prevents "whipping."

Complete literature is available and will be promptly sent to you if you request it on your company's stationery.

Kleenslot

This trade mark shows the non-clogging, non-blinding principle.

Wedge-Wire CORPORATION

GAS STREET AT NICKLE PLATE R. R. WELLINGTON, OHIO

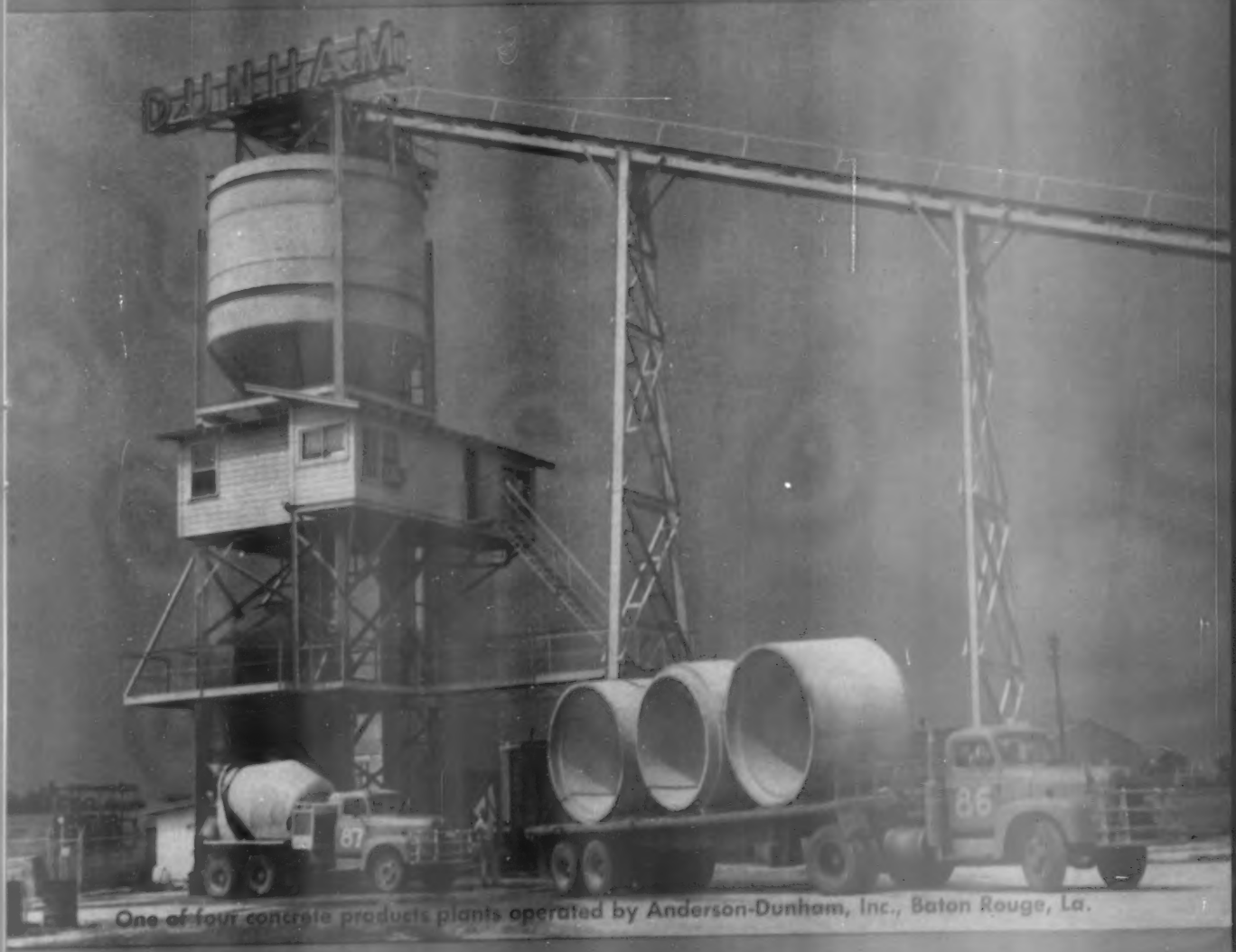
ROCK PRODUCTS

HAS THE LARGEST ABC CIRCULATION AND HIGHEST RENEWAL PERCENTAGE IN THE NON-METALLIC MINERALS INDUSTRY

CONCRETE PRODUCTS

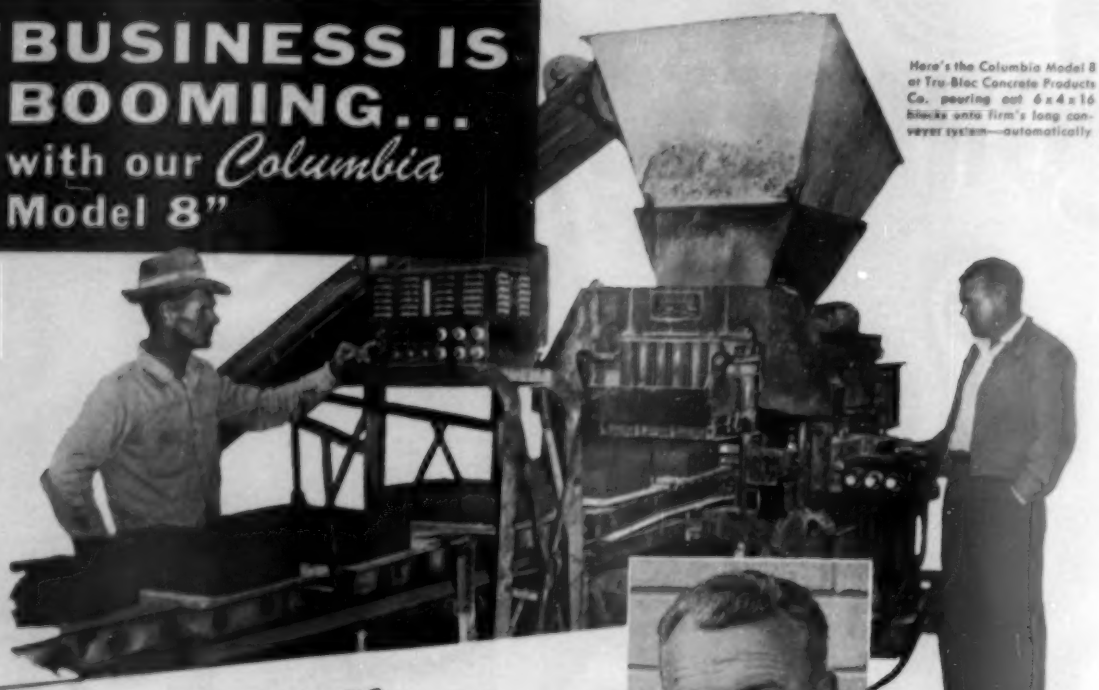
A SECTION OF ROCK PRODUCTS

CONCRETE UNITS . READY-MIXED CONCRETE



One of four concrete products plants operated by Anderson-Dunham, Inc., Baton Rouge, La.

"BUSINESS IS BOOMING... with our *Columbia* Model 8"



Here's the Columbia Model 8 at Tru-Bloc Concrete Products Co. pouring out 8 x 4 x 16 blocks onto firm's long conveyer system—automatically

TRU-BLOC
CONCRETE PRODUCTS

SAND · GRAVEL · REINFORCING STEEL

3336 Madison Avenue, San Diego 16, California

Plant: Texas Street and Friars Road, Mission Valley

Mr. Walter Heth
Sales Manager
Columbia Machine
107 S. Grand Ave.
Vancouver, Wash.

Dear Walt:

You'll be glad to know that our business has really been booming since we installed our latest Model 8 Columbia machine.

Not only are we doing more business with the larger builders and contractors, but we are also making more and more sales direct to home-owners and small builders, furnishing many types of block for patios, planters, walls, fences, etc.

This type of production is no great problem with our Columbia, with its quick mold change, easily replaced wearing surfaces, and high-speed operation made possible by its short head movement—plus the fact that it's fully automatic, requiring minimum attention from the operator.

And this is very important—we get excellent service on parts, meaning that we never lose vital production time while we're waiting for a replacement part!

Sincerely yours,

Harold E. Logan

HAROLD E. LOGAN

HAROLD LOGAN
co-owner of Tru-Bloc Concrete Products

SAN DIEGANS LIKE THE QUALITY & VARIETY OF *Columbia*-MADE BLOCK

Word-of-mouth advertising by satisfied customers is hard to beat as a means of building business . . . and that's what is helping Tru-Bloc Concrete Products Company of San Diego, California, to expand its sales from month to month. To keep up with demand for its wide variety of concrete products, Tru-Bloc relies on the rugged, trouble-free, high-production Columbia Model 8!

FOR COMPLETE INFORMATION ON THE COLUMBIA LINE, WRITE TODAY TO:

Columbia MACHINE

Home Office: 107 S. GRAND, VANCOUVER, WASHINGTON

Factory Branch and Warehouse at Mukwonago, Wisconsin

District Offices in: Wisconsin, Ohio, South Carolina, Mississippi, Florida, New Jersey, Virginia, California, and Massachusetts.

INDUSTRY NEWS

Cover Picture

ON THIS MONTH'S CONCRETE PRODUCTS COVER is an illustration of one of the four ready-mixed concrete plants operated by Anderson-Dunham, Inc., Baton Rouge, La. Three of the plants are in Baton Rouge, and the fourth is in Plaquemine, La. A concrete pipe plant is also operated by this company. Fifty mixer trucks are operated with propane gas fuel. Two-way radio keeps each dispatching office in touch with trucks. In addition to the concrete products division, the company has a limestone and gypsum quarry and crushing plant at Winnfield, La., and manufactures metal culvert pipe, septic tanks, various types of underground storage tanks. The Dunham Tank Co., another division, manufactures a complete line of oil field control equipment.

New Building Block

PRODUCTION OF A NEW TYPE OF BUILDING BLOCK, made from sand, lime and aluminum powder, has been initiated by the Ytong plant, located on the Tel-Aviv Haifa railway line near Pardess Hanna (ISI). The block is a special lightweight porous block brick, said to be particularly suitable for persons building their own homes. The main source of raw material for the block is the sand dunes near Pardess Hanna. Lime is secured from the plant's quarries in Doar, near Haifa. The aluminum powder, which constitutes about 2.5 percent of the cost of the raw materials, is imported. Plant capacity is 50,000 cu. m. of block annually.

Installs Two-Way Radio

RECOGNIZING THE VALUE OF RADIO controlled truck deliveries, seven major ready-mixed concrete companies recently installed two-way radio systems, which were supplied by Radio Corp. of America. The installations include both Fleetfone low-band equipment for operation in the 30- to 50-mc. band, and RCA Carfone-450 UHF equipment for operation in the 450- to 470-megacycle band. The latter equipment is operated in the Citizens Radio Band, 460- to 470-mc., which provides communication services for business operations not covered by other F.C.C. frequency allocations.

The ready-mix firms include Material Service Corp., Chicago,—167 Carfone mobile radios and eight base stations; Hilltop Building Materials, Inc., Cincinnati,—55 Carfone and 16 Fleetfone mobile radios and six Carfone and one Fleetfone base stations; Hilltop-Dayton, Inc., Dayton,—30 Fleetfone radios and two base stations; Clifton Concrete and Supply Co., Lakewood, Ohio,—43 Carfone radios and two base stations; Heston Concrete Supply Co., Indianapolis,—18 Carfone radios and one base station; and C & C Ready-Mix Corp., Johnson City, N. Y.,—10 Fleetfone radios and one base station.

The installations will permit continuous control of the truck fleets and are expected to effect important reductions in operating costs, speedier customer service, and more efficient use of rolling stock.

A.C.I. Regional Meeting

THE AMERICAN CONCRETE INSTITUTE will hold its Southeast Regional Meeting Oct. 31 to Nov. 1, 1955 at the Atlanta Biltmore Hotel, Atlanta, Ga. The tentative program includes the following subjects: construction of Dauphin Island Bridge and Lake Pontchartrain Bridge, thin-shell precast concrete, silicone water repellents for masonry, lightweight-aggregate concrete, concrete masonry wall construction, cracking of masonry walls, concrete stress distribution in flexure, diagonal tension, and concrete shear strength. Co-chairmen for the event are William H. Armstrong, structural engineer, Atlanta, and William R. Ireland, president, Atlanta Aggregate Co., Inc., Atlanta.

Slumpstone Block Developed

GENERAL CONCRETE PRODUCTS, INC., Los Angeles, Calif., has introduced a new masonry product called "Eldorado" Slumpstone, which is used in constructing garden, terrace, and patio walls. Slumpstone walls are reported to cost only slightly more than walls made with block, wood, or wire. The unit is relatively lightweight, gray or tan, and measures 6 x 6 x 16 in. To speed installation, the face of the wall need not be absolutely plumb. Small variations in joints heightens the appearance by stressing a natural, irregular texture.

Wall made from Eldorado Slumpstone 6- x 6- x 16-in. concrete masonry units recently developed by Los Angeles firm

AMERICAN BLOCK CO., INC., Princeton, W. Va., has been incorporated with an authorized capital of $150,000, divided into 1500 shares of $100 par value. Incorporators are Joseph C. Auer, Edith June Auer, Mary Elizabeth Legg, and Basil R. Legg.

DANVILLE CONCRETE PRODUCTS CO., Danville, Va., has been granted a corporation charter. Maximum capital stock is listed at $100,000 with minimum set at $1000. The directors of the company are John Williams, Rutledge Clement and Joseph M. Winston, Jr.

LAMBERT'S CONCRETE WORKS, INC., Sulphur, La., has been incorporated with $26,500 in capital. The articles of incorporation provide for 10,000 authorized shares, at $10 per share. Officers of the company are Andrew D. Lambert, president; Marvin W. Moss, vice-president; and William J. Kutta, secretary-treasurer.

LAKELAND CONCRETE, INC., Hartland, Wis., was recently incorporated with 1250 shares of common stock, no par value. The sole incorporator is J. W. Palmer. Registered agent is N. A. Lombardi.

COLUMBIA CONCRETE PLACING, INC., Cleveland Heights, Ohio, has been incorporated by Peter M. Oddo, Bettina C. Oddo and Robert A. Colombi. Capitalization consists of 250 shares of no-par common stock. Benedict A. Colombi is statutory agent.

HAYSVILLE RED-I-MIX, INC., Wichita, Kans., was recently incorporated by M. K. Gentry, Frank A. Malone, Jr., and Richard F. Mullins. Capitalization was listed at $50,000.

EUREKA READYMIX CONCRETE CO., INC., Eureka, Calif., has been incorporated with a capitalization of $50,000. Directors of the company are Harold F. Nelson, John C. McLaughlin, and Frederick L. Hilger.

BLUNDEN SUPPLIES, LTD., Halifax, N. S., has been incorporated to deal in concrete and other building supplies. Capital stock consists of $20,000. The incorporators are O. J. I. Troy, C. E. Westhaver and P. M. Fraser.

TULSA READY-MIX CONCRETE CO., INC., Tulsa, Okla., has been incorporated by E. F. Rice, Otis E. Nidifier and Thomas E. Warren.

RANGE CONCRETE PRODUCTS CO., Duluth, Minn., was recently granted an incorporation charter. The board of directors consists of Alf Mobroten, Harold Engman and A. T. Emmons.

SUFFOLK READYMIX CONCRETE CO., INC., Suffolk, Va., has been incorporated with $50,000 capitalization. L. C. Briggs is president.

...FOR CONCRETE PRODUCTS!

You can perform white magic in your concrete product! Use Medusa "the original" White Portland Cement for cast stone, concrete blocks, concrete brick and tile, curbing, ornamental concrete, fence and marking posts and many other products, and notice the amazing results. You'll be amazed at their white or colored beauty . . . a new clean look that sets your products apart from any competitors. That's because in all the world there is no whiteness like the diamond blue white of Medusa White. Concrete products manufacturers in every state have built successful business by taking full advantage of the magic of Medusa White . . . And for products whose beauty lasts indefinitely they use Medusa White *Waterproofed*. It sheds water and dirt . . . keeps concrete products free from dirt soiling for years to come.

Medusa White used in the manufacture of Cast Stone for the J. L. Long Junior High School, Dallas, Texas.

MEDUSA Portland Cement Company

1000 Midland Building • Cleveland 15, Ohio

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Cleveland, Ohio
Chicago, Illinois — Toledo, Ohio
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Milwaukee, Wisc. — York, Pennsylvania

WHITE • WATERPROOFED WHITE • GRAY
WATERPROOFED GRAY • AIR ENTRAINING • STONESET
HIGH EARLY STRENGTH • BRIKSET
WHITE TILE GROUT CEMENT

MAKERS OF AMERICA'S FINEST PORTLAND CEMENTS FOR OVER SIXTY YEARS

Jaegers will sell more for you, too

Anyone interested in ready mixed concrete should be interested in knowing why more of it is sold in Jaeger truck mixers than by any other method. A few reasons for this strong preference are shown here. Your Jaeger distributor will gladly give you complete information and figures applicable to your plant and type of operation, local conditions, highway load limitations and payload requirement. See him or send, today, for Catalog.

JAEGER MOUNTINGS are designed to take the stresses of off-the-road operation as encountered on this Voit & Sons pour for Madison, Wisconsin housing project. Jaeger drums, too, are built for 8 to 10 years service.

NOTE JAEGER SEALED END LOADER on this Boston Sand & Gravel Co. mixer pouring concrete for Islington, Massachusetts school. This sealed loader is trouble-free; permits hauling full capacity drum loads.

NOTE THE JAEGER OPEN END "MAXI-LOADER" on this Boozer Transit Mix unit working at Tupelo, Mississippi. It is tops in open-end loaders for fast, clean charging and discharging and no spillage on the road.

OPERATORS FOR CONCRETE SUPPLY CO., delivering 2000 cu. yds. for this warehouse floor in Charlotte, North Carolina, made good use of Jaeger finger-tip single lever clutch and brake control. Faster water for mixing, tempering and flushing is also provided by Jaeger's high pressure jet in drum-head.

THE JAEGER "DUAL MIX" drum is without equal for the mixing and fast, clean, controlled discharge of low slump concrete — an advantage on such jobs as this Service Rock Co., Riverside, California curb and gutter pour.

FOR DISCHARGING INTO BUCKET on this U. S. Route 66 cut-off at Guthrie, Oklahoma, operators for Oakes Materials Co. used the Jaeger chute head. To meet conditions, they always have a choice of 5', 8', 10' or 13' combinations in Jaeger's 3-piece to-the-spot chute — or complete chute swing-away for direct dumping.

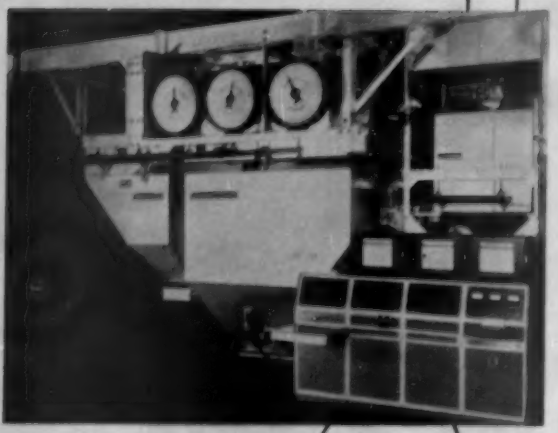
THE JAEGER MACHINE COMPANY

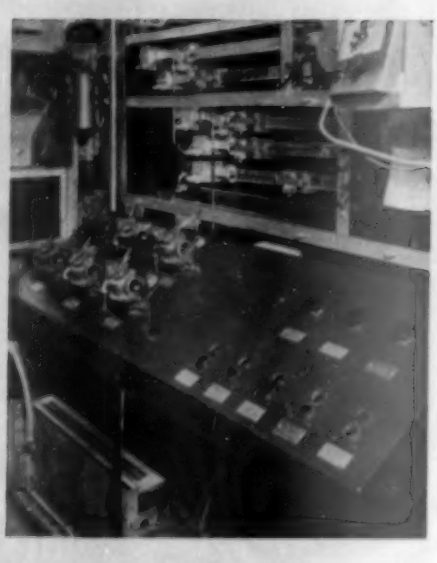
603 Dublin Avenue, Columbus 16, Ohio

LOADERS • AIR COMPRESSORS
PUMPS • MIXERS • PAVING MACHINES

Butler Automation

. . . Tailored to fit your Concrete Plant





Whether you are operating a ready mixed plant or are manufacturing concrete products, BUTLER offers you several approaches to more profitable automatic operation.

The extent of practical automation depends upon a number of factors, and your Butler engineer will gladly analyze these matters and recommend the level of plant automation which will bring you maximum profit at minimum investment.

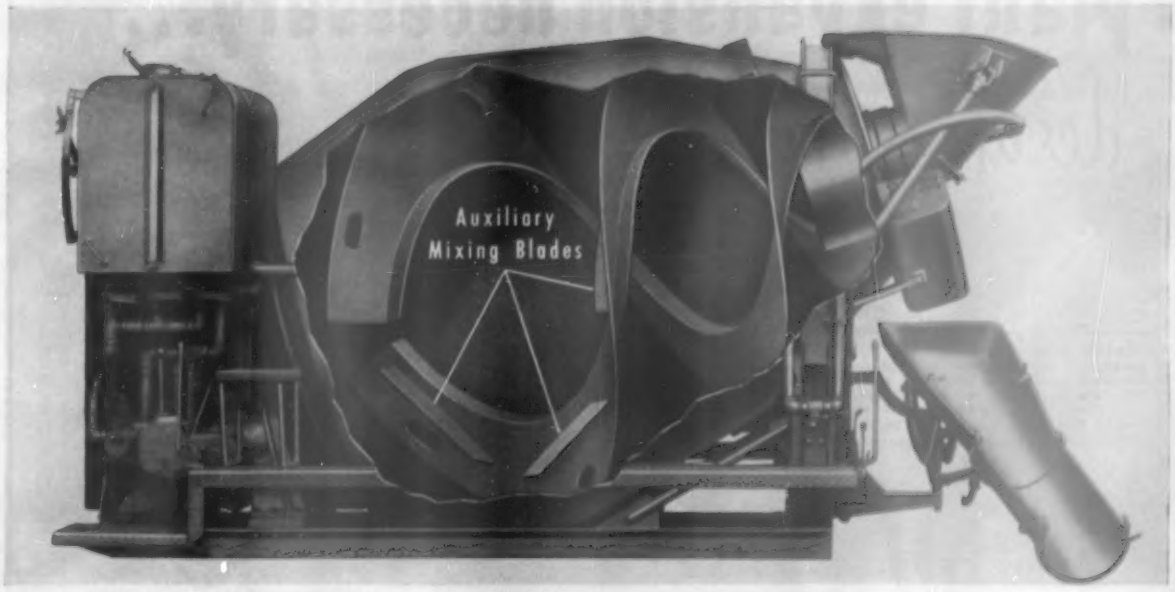
Butler electric and electronic controls provide ranges of automation all the way up to "punched card" remote control batching.

And best of all, BUTLER automatic batching can be installed in any plant regardless of its make.

To modernize your plant for better profits and lower costs, take the first step now. Write for a consultation with the BUTLER engineer.

BUTLER BIN CO.
993 BLACKSTONE AVE.
WAUKESHA, WISCONSIN

WESTINGHOUSE Transit Mixers



The mixers with "double-action" mixing drums for faster and more uniform mix...

• Westinghouse mixing drums are designed for one-direction, open-hopper mixing. Spiral mixing blades are deeper than those of most mixers —and—each spiral is equipped with three auxiliary mixing blades welded to the spirals. These six auxiliary blades (each 36 in. x 7 in.) produce a criss-cross mixing action which prevents segregation and produces the most thorough and uniform mix you ever saw. Furthermore, a Westinghouse is ready to discharge concrete immediately on short hauls where other mixers have to stand by for additional mixing before discharge.

2-Speed Transmission is standard on all models. Provides wide range of drum rotating speeds for mixing or agitating.

. . .

Westinghouse Transit Mixers are available in 5 sizes — 4½ to 6½ yd. Before buying another mixer mail coupon below (attached to your letterhead) for descriptive folder.

ADAMS DIVISION
LeTourneau-Westinghouse Co., Indianapolis, Indiana
Member of NRMCA

Clip and Mail For Descriptive Literature

Send new folder on Westinghouse Transit Mixers to

Name.....

Company.....

St. Address.....

City & State.....

CP

When increased demand makes plant expansion necessary...

design with Fanning-Schuett

CORSON CONCRETE COMPANY, Plymouth Meeting, Pa., is expanding its plant with an additional large storage bin and an additional mixer and batching facilities to meet the expanded demand for central mix in the Plymouth Meeting - Harristown area. The present belt conveyor will serve both storage bins by the addition of a short return belt conveyor for the second bin. Another Fanning-Schuett plant addition.

The problem of providing enough cement and concrete for the tremendous building program of our ever-growing economy has focused attention on the need for plant expansion. All over the country concrete plants are turning to Fanning-Schuett for economical additions to existing facilities.

For new plants as well as these expansions, there is a good reason for designing with Fanning-Schuett. Almost a half-century of experience has given Fanning-Schuett a "know-how" which means top efficiency in cement and concrete handling and storage equipment.

MAINE CEMENT PRODUCTS COMPANY, INC., Portland, Maine. A complete new plant is being designed and built for this rapidly growing company to produce concrete blocks and other products for the Home Building Program. Included in the plant are five storage bins for aggregates; one storage bin for cement; and handling equipment such as machinery for handling cement, screw and belt conveyors and two elevators.

FANNING-SCHUETT JOBS IN PROGRESS

SUPER CONCRETE CO., INC., Cumberland, Maryland. This company is building a whole new plant for ready mix concrete and manufacture of blocks.

CONCRETE PRODUCTS COMPANY, Shippensburg, Penna. This company manufactures concrete blocks and other building products and is now converting to handle bulk cement. They are installing an unloading screw conveyor and elevator, a storage bin for 400 barrels, a screw conveyor and automatic controls for scale equipment over the mixer.

RIDGE CONCRETE, INC., Bartow, Florida. The ready mix concrete plant of this company is being expanded, and they are also installing block-making equipment for which they have purchased storage bins and an extension of their present belt conveyor system.

McDERMITT BROS. READY MIX CONCRETE, Gettysburg, Penna. This company is prominent in the Gettysburg area and has been in the ready mix business for many years. They have just made a large installation at Union Bridge, Maryland to supply ready-mix concrete for the expansion of the facilities for the Lehigh Cement Co. They have also made a complete setup for handling of aggregates including elevators for sand and stone and a bulk cement handling outfit.

GELBMAN, INC., EXPANDED AGGREGATES CORP., New York City, N. Y. This company is starting to build a complete plant for manufacturing light weight aggregates from slate wastes. They will install rotary dryers, belt conveyors, crushers, mixers, etc., to make a complete plant for the manufacture of light weight aggregates by sintering.

FANNING-SCHUETT ENGINEERING COMPANY
4025-39 NORTH THIRD STREET PHILADELPHIA-PENNSYLVANIA

BIGGER PROFITS with VIBRAPACS

Backed by Besser Cooperative Advertising

Bill's block sales are going *down*, because he doesn't have the best facilities for production and promotion.

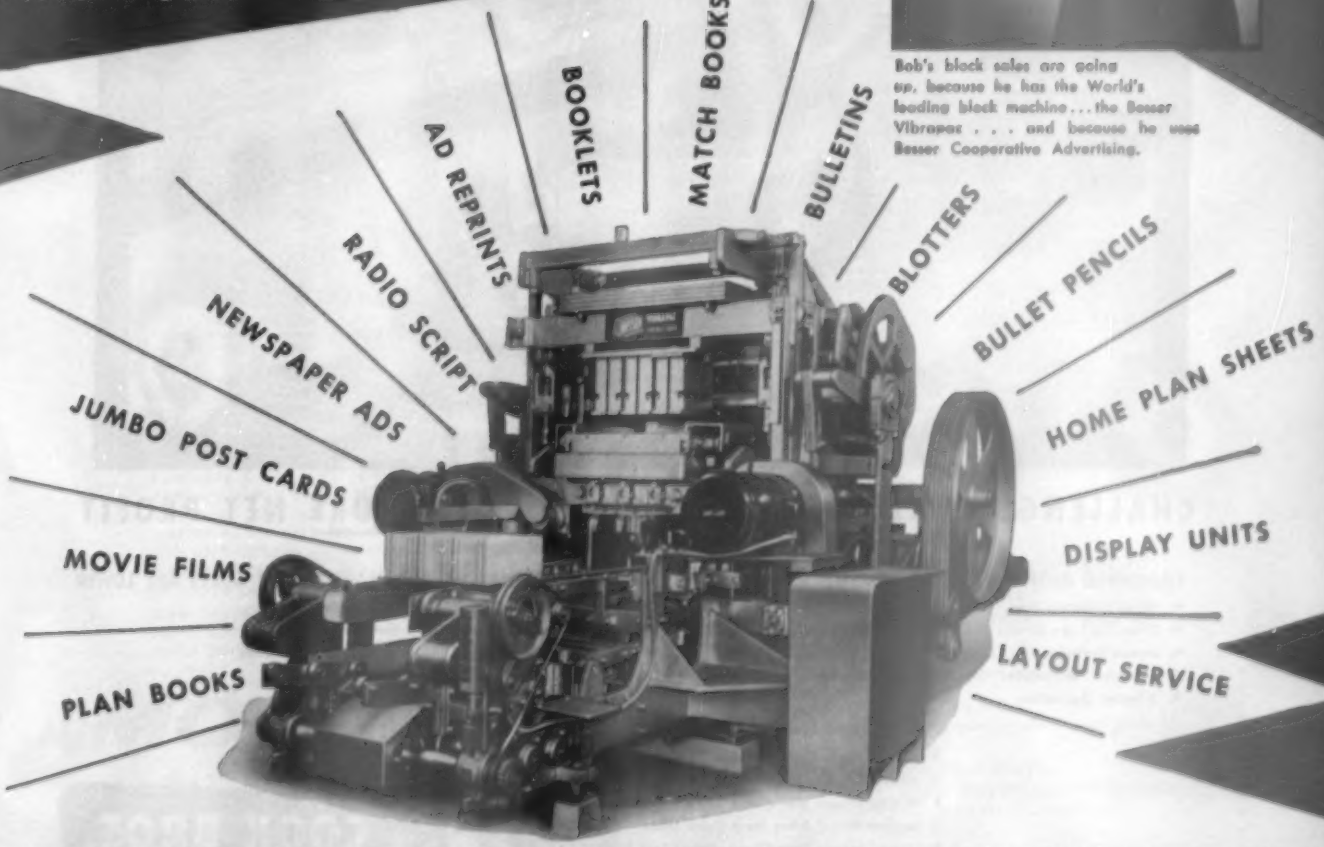
You not only want to *produce* more block — you want to *sell* more block, at a profit. Besser helps you to do *both*, by providing the World's leading block machine and a complete assortment of "sales tools". Many sound advertising and merchandising aids to sales are offered in the new Besser Cooperative Advertising Manual — sent FREE to all VIBRAPAC Block Plants. If you have not already received your copy — write for it today.

BESSER National Advertising Stimulates Demand for Block

Besser advertisements in practically all architectural and building publications are winning public acceptance of concrete masonry as a modern building material. This extensive and continuous promotional campaign is building a solid foundation for progress for all VIBRAPAC Block Plants.

Bob's block sales are going *up*, because he has the World's leading block machine . . . the Besser Vibrapac . . . and because he uses Besser Cooperative Advertising.

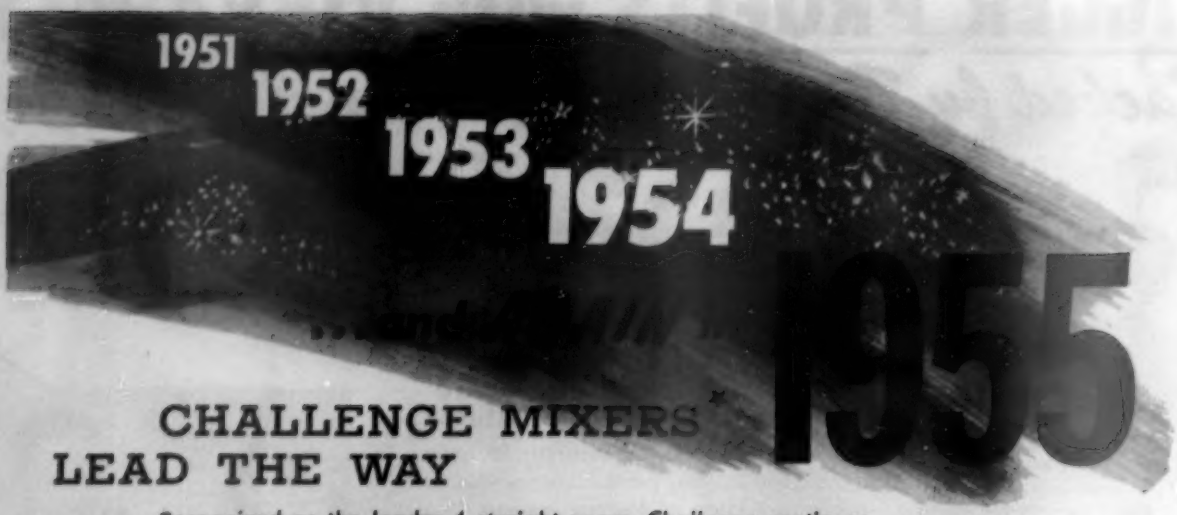
Besser Vibrapacs Assure Success



BESSER COMPANY

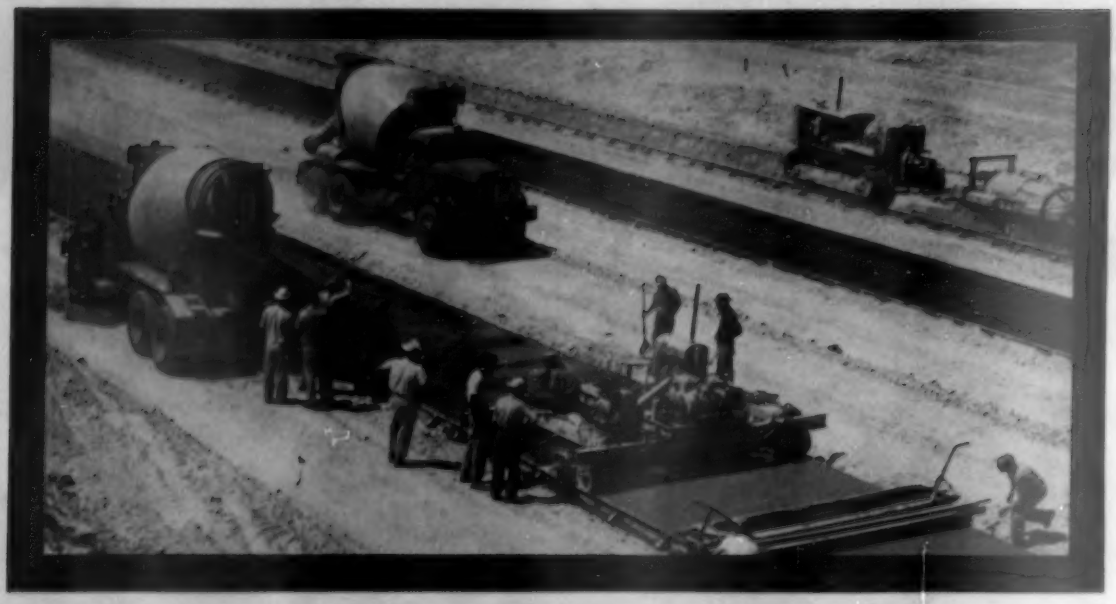
BOX 135 • ALPENA, MICHIGAN, U. S. A.

Complete Equipment for Concrete Block Plants



CHALLENGE MIXERS LEAD THE WAY

Recognized as the leader 4 straight years, Challenge continues to set the pace in 1955. Records show that more and more operators depend on Challenge Mixers as the backbone of their truck mixer fleet!



CHALLENGE MIXERS ENABLE YOU TO MAKE MORE NET PROFIT

CHALLENGE OUTPERFORMS ON ANY JOB

- Saves Valuable Time • Labor • Money
- Gives the Type Service Your Customers Want and Appreciate
- Makes Uniform, Top Quality Concrete Regardless of Slump
- Exclusive "Mixometer" Shows Proper Drum Speed at All Times
- 2-Speed Operation

CHALLENGE OPERATING AND MAINTENANCE COSTS ARE LOWER

- Proved, Simplified Design, Yet Tough and Rugged
- No Complicated Mechanism to Get Out of Order
- Use of Standard Automotive Engines and Drive Units
- Only Eleven Regular Lubrication Points

CHALLENGE HAS LONGER, MORE DEPENDABLE SERVICE LIFE

- Double Drum Head Made of 1/4" Abrasion and Corrosion Resistant Steel Plate
- Heavy 3/16" Abrasion and Corrosion Resistant Steel Plate in Drum
- Mixing Blades Made with 3/16" High Tensile Steel
- Largest Nickel Alloy Steel Drum Shaft
- Larger, Heavy Duty Chain, Offset Link Type

**value standard of the industry . . . . . .*

COOK BROS. TRUCK EQUIPMENT

COOK BROS.
EQUIPMENT COMPANY
3334 San Fernando Road, Los Angeles 65
Telephone: CLeveland 6-3151

FORT WORTH SAND AND GRAVEL CO. V. P. CHARGE OF SALES, GEO. A. MEIHAUS, SAYS:

"Radio saves us $10.00 a day per truck"

Mixer driver Alvin E. Hobbs has just received instructions to proceed directly to his next job without going back to plant.

From his mobile repair van J. A. Markham talks directly to drivers, often diagnoses trouble so driver himself can make emergency repairs.

Chief radio dispatcher Coy Anderson gives instructions to a driver miles away.

READY MIX OPERATORS:

HERE IS CONSTANT CONTROL OF 51 TRUCKS OPERATING BETWEEN 5 PLANTS

Diverting trucks as needed to handle the output of five separate mixing plants was a king-size job. But Motorola 2-way radio has reduced it to everyday routine for the Fort Worth Sand and Gravel Co. of Texas.

Constant radio control—every minute of the day—of every one of the 51 mixers has resulted in a *saving* of about 20% in mileage per yard of delivered concrete. Drivers get their new orders *at the job site*, and usually go *directly* to the next job without needless travel. Radio actually gets an *extra hour* of bonus production daily from every truck.

Besides speeding delivery and giving better customer service, Motorola 2-way radio has cut costs many other ways. Overtime of drivers and batch plant personnel has been slashed at Fort Worth. Telephone "hunting" by drivers has ended . . . reports are sent and orders received right in the cab. One radio equipped service van does the work of two . . . speeding repair and cutting down-time.

Five supervisors, out most of the time in their radio equipped cars, have instant contact with the main office. Meihaus says his company wouldn't be without 2-way radio now.

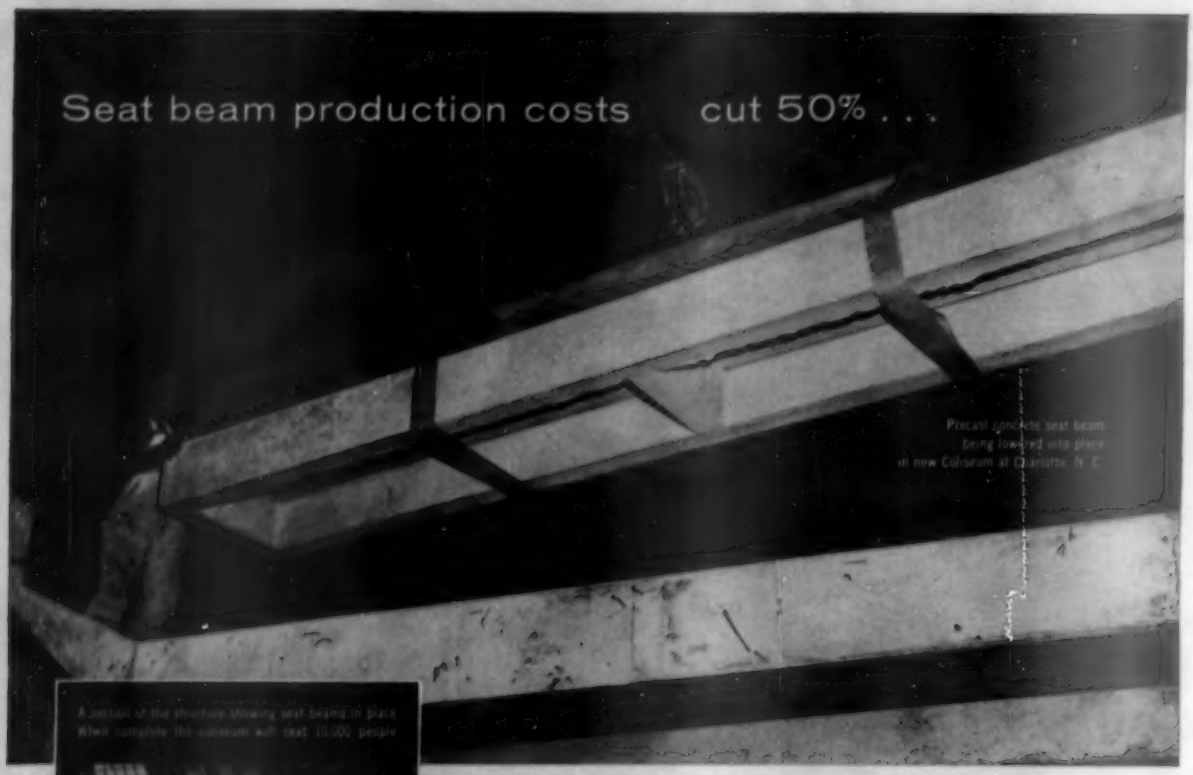
Find out how Motorola 2-way radio can pay for itself quickly by cutting costs for *you*, and go on to earn extra profits month after month. A Motorola Engineer will show you how. Write, phone or wire—TODAY!

MOTOROLA

2-WAY READY MIX RADIO

MOTOROLA COMMUNICATIONS & ELECTRONICS, INC.
A SUBSIDIARY OF MOTOROLA, INC.
4501 AUGUSTA BOULEVARD • CHICAGO 51, ILLINOIS
ROGERS MAJESTIC ELECTRONICS LTD., TORONTO, CANADA

Motorola consistently supplies more mobile and portable radio than all others combined.
Proof of acceptance, experience and quality.
The only COMPLETE radio communications service—specialized engineering . . . product . . . customer service . . . parts . . . installation . . . maintenance . . . finance . . . lease.
"The best costs you less—specify Motorola."



Architect: A. G. ODELL & ASSOCIATES, Charlotte, N. C.
Consulting Engineers: SEVERUD-ELSTAD-KRUEGER, New York City
General Contractor: THOMPSON & STREET CO., Charlotte, N. C.
Manufacturer of Precast units: CONCRETE MATERIALS, INC., Charlotte, N. C.

with LEHIGH EARLY STRENGTH CEMENT

The unique design of the new coliseum and auditorium at Charlotte, N. C. called for 1000 precast concrete seat beams, each weighing 4000 pounds.

Using Lehigh Early Strength Cement and mass production methods to cast the beams, Concrete Materials, Inc. were able to strip and re-use forms within 24 hours. The beams were ready for placing in 72 hours, *less than half the time* that would have been required with regular concrete.

This fast production schedule, made possible by the use of Lehigh Early Strength Cement, cut labor, curing, form and general overhead costs by 50%.

These results are typical of the savings that manufacturers can expect when using Lehigh Early Strength Cement in casting quantities of special units.

LEHIGH EARLY STRENGTH CEMENT
LEHIGH PORTLAND CEMENT
LEHIGH AIR-ENTRAINING CEMENTS
LEHIGH MORTAR CEMENT

LEHIGH

PORTLAND CEMENT CO. *Allentown, Pa.*

BESSER

The Washington, D. C. Skyline as it is viewed from the Washington Concrete Products, Inc. cement tower.

★This is the 122nd of a series of ads featuring leaders in the Concrete Block Industry who are stepping up block production with Besser Vibrapac machines.

2 generations in both executive and plant management. (Left to right) President Austin Davis and his father, Herbert Davis, long an outstanding figure in the concrete block industry. Ernie Hileman, shop foreman and his father, E. A. Hileman, Sr., plant superintendent.

One of the Vibrapacs in operation. Produces high quality block on a fast production basis. Machine is fully automatic. Only one man required to guide the power off-bearing hoist.

Special "dunking" device, showing how the company dips racks and pallets in oil.

Washington Plant Prefers High Production VIBRAPACS to Meet Rising Competition

Washington Concrete Products, Inc., Arlington, Virginia, began block making operations in 1924. Nineteen years later they installed their first Besser Automatic Tamper. In 1947 additional production was required and they installed their first Vibrapac. One year later another Vibrapac was added. Both machines have now been replaced with the latest model front feed Vibrapac.

Why are Vibrapacs used, exclusively? Company officials like their high production of quality block with minimum of downtime. That means greater output . . . more satisfied customers . . . bigger profits. President Davis puts it this way: *"We have confidence in Besser's ability to keep us efficient in a highly competitive market".*

You, too, can UP profits with dependable, High Production Vibrapac machines. Contact your nearby Besser representative, or write:

BESSER COMPANY

BOX 135 • ALPENA, MICHIGAN, U. S. A.

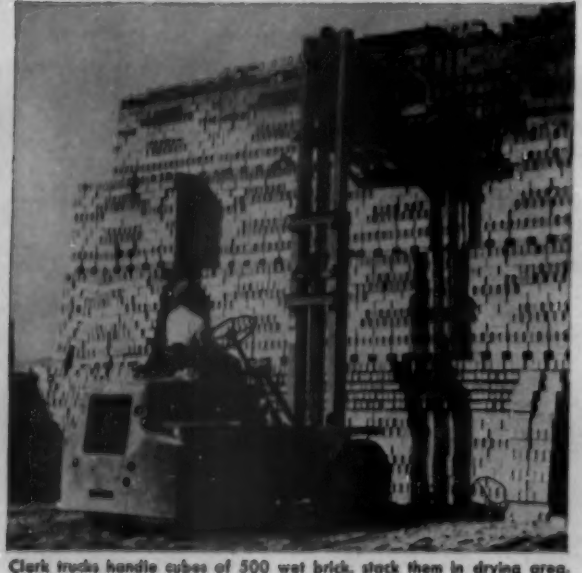
Complete Equipment for Concrete Block Plants

Yard scene at the Washington Concrete Products plant. Note large stock pile of quality block.

A 8437-1PB

300,000 sq. ft. drying area used by Union Brick Co.

Production up 6 million brick — no increase in personnel



Clark trucks handle cubes of 500 wet brick, stack them in drying area.

Union Brick Company, San Diego, California, currently produces 100,000 bricks a day, have increased production from 8 million to 14 million bricks per year. From the time wet brick is cubed to the time of delivery . . . the entire job is handled by Clark fork trucks.

"We work our Clarks hard," says John W. Rice, Jr., president of the company. "Yet, they require a minimum of maintenance, are easy to handle, do a great job. Our original Clark machine purchased in 1947 is on the job every day.

"It's because of these Clark trucks that we were able to increase production without increasing the number of our employees."

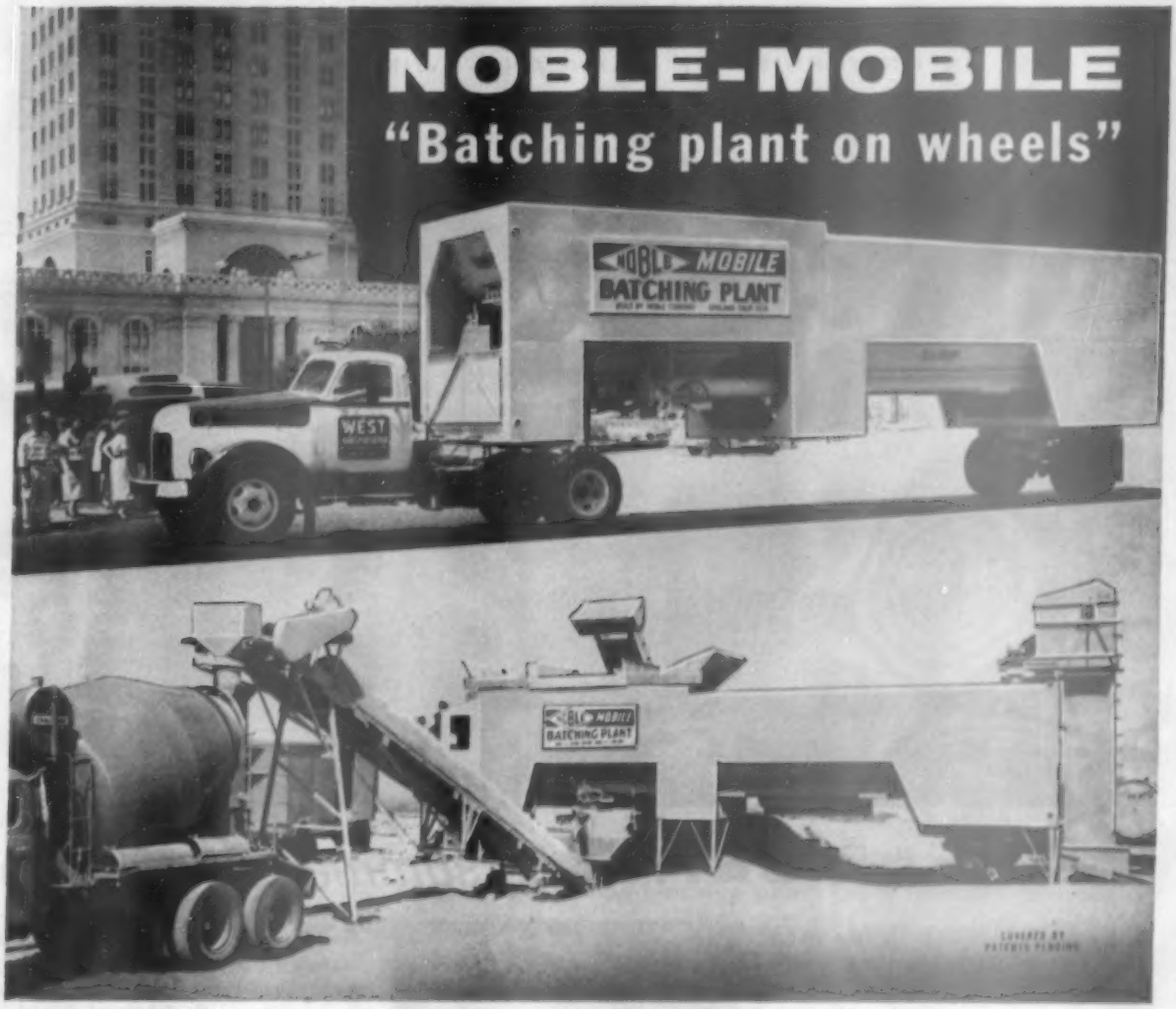
CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 60, Michigan

A BETTER BUY WITH LOCAL SUPPLY — *Genuine Clark Parts*

NOBLE-MOBILE

"Batching plant on wheels"



the complete plant that saves erection costs... drive it to the job site and start batching!

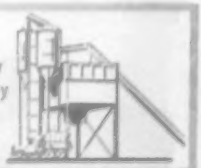
Noble-Mobile lets you batch at the job site proper where shorter hauls result in greater capacity. You go quickly into production . . . no footings, crane or electrical wiring required.

Noble-Mobile utilizes bulk cement. Aggregates charged with scooploader, conveyor or clam-shell. 60 yards per hour or more output to truck mixers. Noble-Mobile drives the highways within legal limits. No special permit required.

NOBLE BATCHING PLANTS

Noble-Mobile

Portable or semi-portable plants

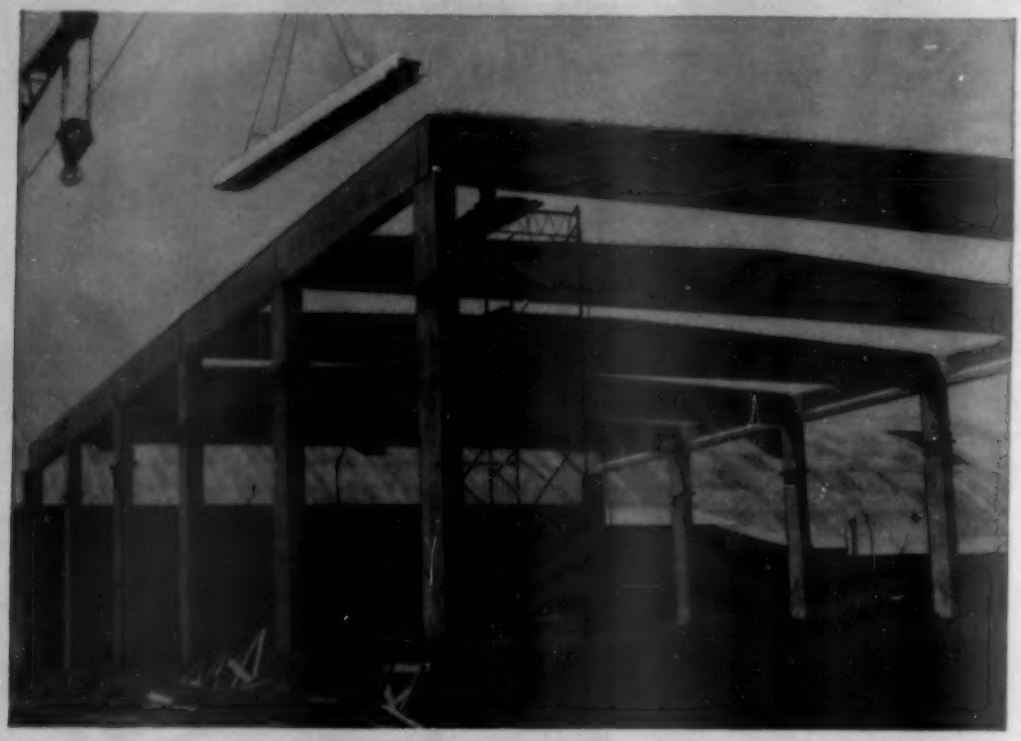

High capacity stationary plants

• DESIGNERS AND BUILDERS •

For further details phone, write or wire **NOBLE COMPANY**

1860 7th Street, Oakland 20, California, TEmplebar 2-5785 • 20950 Center Ridge Road, Cleveland 16, Ohio, EDison 1-3426

75-FT. PRECAST, PRESTRESSED 'INCOR' CONCRETE GIRDERS USED IN UNIVERSITY OF MARYLAND SWIMMING POOL WING



PREFABRICATION... *summa cum laude*

● By making possible lighter members and longer spans, prestressing adds a new dimension to the high economy potential of precast concrete.

Precast, prestressed girders for this 75′ x 140′ Swimming Pool Wing to the Athletic Activities Building at the University of Maryland are 75′ long, 36″ deep at ends, 4′ 7″ at center, average depth-to-span ratio approximately 1:20.

All other structural members—the 14″ x 32″ x 23′ columns, 14″ x 36″ x 23′ spandrels, and the 10″ x 24″ x 23′ channelcrete lightweight roof slabs—are precast reinforced concrete.

Designed for span and load, these factory-made members were pro-

UNIVERSITY OF MARYLAND; Swimming Pool Wing

Architect:
HALL, BORDEN & DONALDSON, Baltimore, Md.

Structural Engineer:
CARL HANSEN, Silver Spring, Md.

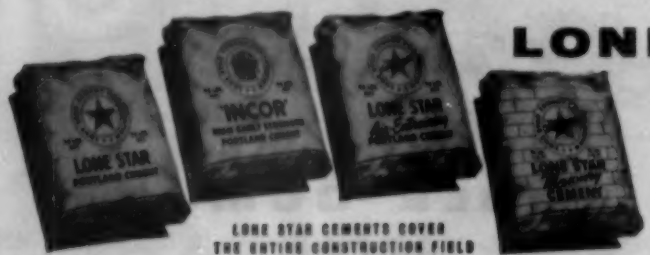
General Contractor:
BALTIMORE CONTRACTORS INC., Baltimore, Md.

Prestressed Members Made and Erected by
FORMIGLI CORPORATION
Berlin, N. J. . Philadelphia, Pa.

duced to closest tolerances by the Formigli Corporation, Berlin, N. J., for fast erection—"field practical" is the term for it. Prefabrication with a *summa cum laude!*

Here is the structural stability and fire-safety of well-designed concrete . . . with factory-made, quality-controlled members for lowest erection and maintenance costs... plus significant production economies through assembly-line operation in the pretensioning bench, utilizing the dependable high early strength of 'Incor'* 24-Hour Cement for 24-hour form removal... quality concrete which is so important in the fullest realization of prestressing's advantages.

*Reg. U. S. Pat. Off.



LONE STAR CEMENTS COVER THE ENTIRE CONSTRUCTION FIELD

LONE STAR CEMENT CORPORATION

Offices: ABILENE, TEX. • ALBANY, N. Y. • BETHLEHEM, PA.
BIRMINGHAM • BOSTON • CHICAGO • DALLAS • HOUSTON
INDIANAPOLIS • KANSAS CITY, MO. • NEW ORLEANS • NEW YORK
NORFOLK • RICHMOND • WASHINGTON, D. C.

LONE STAR CEMENT, WITH ITS SUBSIDIARIES, IS ONE OF THE WORLD'S LARGEST CEMENT PRODUCERS: 18 MODERN MILLS, 141,600,000 SACKS ANNUAL CAPACITY

Batching plant, showing control room below main bin, with secondary belt conveyor extending from this bin to distributor of concrete products plant bin. Trucks deliver aggregates to boot of main belt conveyor in concrete pit, to the left

AUTOMATION
Applied to A New Ready Mix Plant

• The Hovey Concrete Co., Flint, Mich., installs electronic controls in recently completed batching plant. Glass enclosed, air-conditioned control room near ground level keeps operations within view of the dispatcher

By W. R. MILLER

DURING THE PAST FEW YEARS the term "Automation" has come into rather wide use with reference to completely automatic processes in manufacture. This article describes a modern ready-mixed concrete operation wherein the principles of automation are used extensively to control quality, increase output, and reduce manual labor to a minimum.

The Hovey Concrete Co., Flint, Mich., was founded in 1947 as a manufacturer of concrete products. Ready-mixed concrete was added to the line in 1951. When the present management took over operations about two years ago, production averaged 6000 8- x 8- x 16-in. equivalents and 350 cu. yd. of concrete per day during the busy season.

A detailed study was made of the operations at that time and a long term expansion program was started. By careful planning and scheduling, the expansion program has been substantially completed without shutting down or seriously interfering with regular daily production. The modernization and automation of the ready-mix operation is now complete and connections made with the products plant which also have increased output and efficiency in this department.

Considerable new equipment has been added while existing equipment was modified to new uses. The engineering was done by the Hovey Co.'s own force with assistance from Erie Strayer Co., Pioneer Engineering Works, and Hardy Scale Co., manu-

A portion of the large storage yard for concrete products as seen from the top of the main bin over ready-mixed concrete batching control room

Control room near ground level is completely glass enclosed and air-conditioned. Harold Southwell, batch operator, is in foreground, and Russell Titus, dispatcher, in background

facturers of the equipment used, all of which was sold through Contractors Machinery Co., Detroit, Mich.

Storage Facilities

Overhead aggregate storage consists of a 267-cu. yd. (400-ton) Erie four-compartment aggregate bin. This is fed by a 24-in. Pioneer inclined belt conveyor, 236-ft. centers, capable of handling 290 tons of aggregate per hour. The boot of this conveyor extends downward into a concrete pit approximately 11- x 44-ft. and 28 ft. deep. Located in this pit, with the tops flush with grade are two two-compartment Erie aggregate bins with a total capacity of 240 tons. These bins are arranged so that trucks drive over the top and dump directly into them. Rehandling of aggregates in the yard is thus practically eliminated. Tunnel gates under these bins feed directly onto the conveyor. The tunnel gates are air operated and controlled from either the operator's room or the pit.

A rotary distributor atop the overhead aggregate bin directs the material into any of its four compartments or onto a secondary Pioneer belt conveyor, 62 ft. centers, which carries it to a second distributor atop the three-compartment products plant bin.

The 7-cu. yd. Erie aggregate batcher under the main bin has air-operated charging gates and also an air-operated discharge gate with inching controls to permit accurate control of the discharge rate into the mixer trucks.

The existing aggregate bin was converted into a cement bin holding 1200 bbl. by adding a top section and cover and a new bottom section with aeration jets. A combination vane and screw feeder was installed under this bin. The old aggregate elevator, which was a fully enclosed belt bucket type, was converted into a cement elevator that handles a capacity of about 325 bbl. per hour.

The existing cement factilities which include both elevated and ground storage bins plus an elevator were retained. An inclined screw feeder from one of these has its discharge close to the vane and screw feeder under the converted aggregate bin.

A 42-cu. ft. Erie cement batcher is mounted under the converted bin. This is in line with and 30 ft. from the main aggregate bin. The scales and controls described later permit remote batching from either cement bin through this batcher.

Unusual Control Facilities for Concrete Batching

The dispatcher's office and control room is completely glass enclosed and air conditioned. The scale equipment for both aggregate and cement, as well as all controls, is located here. Instead of being at the conventional operator's floor level above the driveway, it is located 6 ft. above grade and adjoining the aggregate bin. Conveniently located in the control room are all controls, including the Hardy full dial electronic scales which are fully automatic. Instead of the usual 20-in. dia. dials these scales have 36-in. diameter dials with 2-lb. graduations on the cement scale and 15-lb. graduations on the aggregate scales.

The operator sits at a control desk facing the driveway where he can watch the charging of both cement and aggregate into the mixer trucks. The two-stop system is used with one mixer being charged with cement while the next in line is being charged with aggregate and water. At the operator's finger tips are push buttons for any of the various pre-set batches, water, admixtures, batcher discharges, tunnel gate controls, etc. Behind him stands the cabinet containing the electronic equipment, pre-set adjustments, and interlocks which prevent discharge of any batch unless the weights of each ingredient are correct. The dispatcher's desk, with telephone, two-way radio, and P. A. system, is located right beside operator's control board.

The delivery fleet consists of eight 6-cu. yd. Rex mixers and twelve 6-cu. yd. Worthington mixers. Most of these are mounted on International and Mack trucks.

Looking down the main belt conveyor, showing the concrete pit and the four underground aggregate storage bins

Left to right: Mike Salamo, superintendent; Carl Creger, vice-president; and Sherwin Palmer, president

Over 1000 cu. yd. of concrete have been delivered in an 8-hr. day through this plant.

Concrete Block Plant

With a heavy demand for concrete block, the Hovey Concrete Co. is now operating two shifts in the products plant, producing 25,000 8- x 8- x 16-in. equivalents daily. By filling both the products plant bin and the ground storage bins before the day shift goes off duty, it is possible to run the entire second shift without any yard help or night deliveries of aggregate. On the few occasions when this supply has run out before the day shift came on duty, aggregate was transferred from the main bin to the ground storage bins by dump truck and run up to the products plant bin.

Sherwin Palmer is president of the company. Other officers include: Carl Creger, vice-president and assistant manager; and Catherine Carroll, secretary. The plant is located at 3421 E. Court St., Flint, Mich.

Self-Loading Block Truck Body

A. Cresci & Son, Inc., Vineland, N.J., has announced a self-loading body which is said to permit one-man loading of 720 concrete block in 12 min. without breaking or chipping. The truck body is available in three and four-ton units with the unloading mechanism overhead to provide a clear platform. The load is carried on an overhead boom in a trolley-like operation, and can be turned on a swivel to facilitate stacking and close operation or lowering into excavations. Hydraulic operation is featured with dual controls on the side, and a non-jamming safety factor. Power take-off operated, the self-loader also features simplicity.

One man loads 720 block in 12 min.

N.C.M.A. Plant Safety Contest

National Concrete Masonry Association, Chicago, Ill., has announced its second annual plant safety contest, which is open to all N.C.M.A. members and covers the period August 1, 1954 to July 31, 1955.

According to Earl W. Peterson, Ideal Cement Stone Co., Omaha, Neb., chairman of the N.C.M.A. Accident Prevention Committee, three factors will be considered in judging the safety records of competing firms —production volume, overall safety record, and total number of man hours worked by employes assigned to the production of concrete masonry products. Consideration of these factors will give all producers an equal chance at the prizes. Firms will be divided into three production categories:

A. Plants producing more than 5,000,000 8- x 8- x 16-in. equivalent units in the period covered by the contest.

B. Plants producing 1,500,000 to 5,000,000 equivalent standard units.

C. Plants producing less than 1,500,000 equivalent standard units.

The safety chairman explained that for purposes of the contest, the production of all units is converted to standard 8-in. block by a table designed for that purpose.

The contest will be judged by the N.C.M.A. engineering department and winners will be announced prior to the annual convention in New Orleans, La., January 23-25, 1956. Prizes will be awarded at the convention in each category of production, and all accident-free firms will receive an award. Certificates or appropriate mementos will also be awarded to employes of the winning plants.

An important result of the contest will be a comprehensive report to all N.C.M.A. members on the accident records of the contestants. The report will include statistics on the number of man hours required to produce 1000 8- x 8- x 16-in. standard units.

In order to protect the competitive position of contestants, the report will designate firms by a code number instead of by name. The code number of each plant will be known only to officials of the plant to which it is assigned.

The safety contest was inaugurated last year when it became apparent that the industry was lagging far behind others in reducing the frequency of accidents. Statistics gained as a result of the 1954 safety contest indicate the accident frequency rate has been reduced for the industry as a whole.

"This is significant," the chairman said, "but the rate is still far too high. The concrete masonry industry cannot afford the waste of manpower through accidents, which has been roughly estimated to be 1.5 percent of all manpower in the industry. We cannot afford it as reflected in the direct cost of insurance premiums or in the indirect cost of decreased production efficiency, which of course affects our competitive position by unnecessarily increasing our costs."

Wall plaque to be awarded by National Concrete Masonry Association in second annual plant safety contest at the N.C.M.A. convention in New Orleans, La., January 23-25, 1956. Diane Daniggelis, who was named Miss Photoflash of 1955, is the pretty lass holding the award

●

New Jersey State Concrete Products Association has been reorganized with Walter J. Decker, Ridgefield, N. Y., as its executive secretary. Albert J. Faber, Faber Cement Block Co., Paramus, N. J., is president.

Feeding clinker to a grizzly with a 1-cu. yd. clamshell. Oversize goes to a small crusher and is returned to the belt conveyor inclining up to the screen house. Portable conveyor, to the left, returns oversize from the screens for recrushing and screening

Move Block in Trains from Autoclaves

• Chandler Materials Co., Tulsa, Okla., cures 18,000 block per day in two new high pressure autoclaves. Produces its own lightweight aggregates

By TIP BROWN

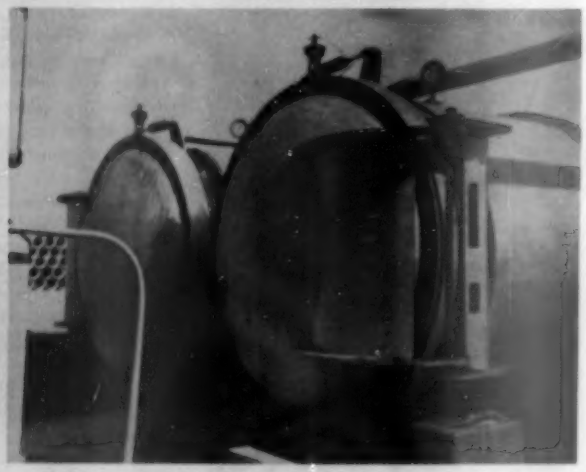
THIS IS THE STORY of how a producer in Tulsa, Okla., Chandler Materials Co., landed on the autoclave band wagon with an interesting method of handling cured block from the cylinders in 15-car trains of flatcars.

The company has been in the aggregates producing field for 40 years. It all started with the founder, James M. Chandler, who was a pioneer railroad man, and late in life drifted into the sand producing business on the Arkansas River, only a few miles from mushrooming Tulsa. Three sand plants are still operating under the Chandler name. They are equipped with 8-in. dredge pumps and stiff leg derricks for handling sand from the settling pits to stockpiles. The plants produce 25 to 30 cars daily which are shipped by rail to consumers in the area.

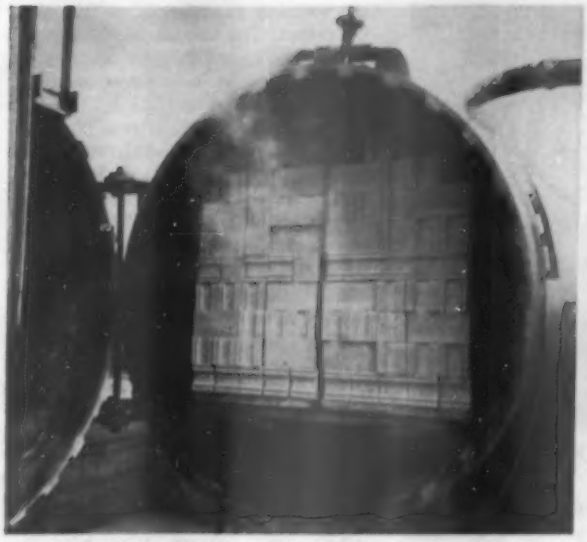
Add Stone Production

Getting into the crushed stone business was a natural step, under the swollen demands of road construction, paving, concrete products, ready-mixed concrete and asphalt plants. An old quarry was acquired in 1923, which now has been expanded to 220 acres and stone production from 2500 to 3000 tons per day. The equipment includes two washing plants, and three unitized crushing plants. About 1600 tons are handled daily through the two washing plants. Years of operation have created a long, exposed quarry face, with loading done by 1½-cu. yd. diesel shovels.

Rear view of autoclaves showing insulation in place



Quick-opening doors with screw and gauge safety devices



Train of 15-cars in autoclave at end of curing cycle

Lift truck handling cubed block from flat cars

Expanded Shale Lightweight Aggregate Production

The growing market for lightweight concrete induced the company last year to erect an expanded shale aggregate plant on the quarry property, 12 miles east of Tulsa at Garnett, Okla. An abundance of excellent shale is nearby, and a plant of simple design, but laid out for easy expansion, was erected to serve the present daily needs of 120 cu. yd. of finished production, most of which is absorbed by the Chandler block plant.

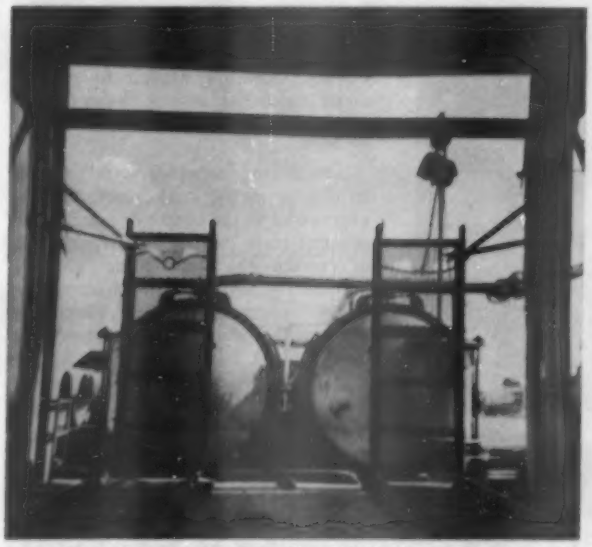
Raw shale is reduced to two sizes, ½ to 0 in. and ¾ to ½ in., and then conveyed to a "teepee," an enclosed storage building holding 1500 tons of raw material. A novel method of feeding raw material to the kilns is employed. Material drops from the top of the "teepee" to the stockpile from which it flows by gravity to a Syntron feeder and thence to a tunnel belt conveyor that carries it up to a hopper feeding the 6- x 70-ft. rotary kiln. Material passes through the kiln in 35 to 40 min., subjected to maximum temperatures of about 2300 deg. Natural gas fuel is used. The kiln rotates at 2 r.p.m.

Clinker drops into an excavated rock pit, 10 ft. deep, and is picked up by a 1½-cu. yd. Link Belt Speeder equipped with a clam shell and moved to open storage for a 24-hr. cooling period by natural air circulation. Wetting down with spray bars is also used for further cooling. From storage, the clinker is moved to the screening section of the plant by clam shell where three separate sizes are produced: ¾ in. to No. 4, ⅜ in. to No. 4, and No. 4 to 0 in. The latter two sizes are for block production.

Finished material is shipped by truck in separate sizes to avoid segregation. The company consumes most of the 120 cu. yd. daily production in its own operations, but a rapid increase in structural uses for lightweight concrete is causing consideration of the addition of a second kiln. In the original kiln installation, ample capacity was provided for shale storage and for screening in processing the increased tonnage which will be produced when the second kiln is installed.

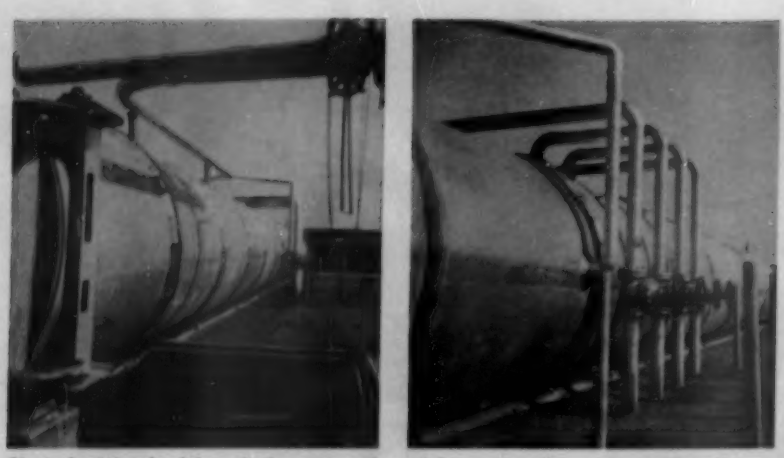
Block and Pipe Operations

The concrete block and pipe plant, on a 21-acre site in the east section of Tulsa, has for many years been a land-



Front view of autoclaves. Note drawbridges and rails

Loaded train of cars with winch, to the left



Six-inch piping lead from boiler to autoclave, left; **steam release pipes** with valves to handle "blow-down," right

mark by reason of the unusual design of the plant buildings. The block plant has two Besser V3-R machines which produce around 800 block per operating hour. The eight curing rooms, 8 ft. wide and 80 ft. long, are of a conventional high temperature, no pressure type. Racks carry the green block from the machines into the curing rooms for a 20-hr. first stage curing. Block are then placed in 120-block cubes to be transported to flat rail cars for final curing in the autoclaves.

Investigate New Curing Method

Always responsive to changing conditions, and the need to view them with open minds, the company investigated autoclave installations in various sections of the country. The final result was an installation the early part of this year of two autoclaves, 120 ft. long and 8 ft. 6 in. diameter, constructed of ⅛-in. steel plate with a 2½-in. Johns-Manville rock wool blanket covered with galvanized sheet iron. All joints of this metal sheeting are soldered. The autoclave cylinders rest on steel channels extending the full length with any movement taken up on well-lubricated I beams.

A new laboratory and boiler room were erected near the autoclaves. The laboratory is equipped to perform sieve analyses of materials, and make the usual strength and moisture tests on block. Tests of boiler water are made frequently. A gas-fired, 300-hp. Holmar water tube boiler has been installed. It has a capacity of 16,000 lb. of steam per hour. Taylor chart controls of both pressure and temperature recordings are followed during the day by the plant superintendent, and later by the office for a study of operating history. About 70 ft. of piping leads to the two autoclaves. Steam pressure is set for 170 lb. before setting off safety valves. Normal operations are for 150 lb. steam pressure and 355 deg. temperature.

The blow-down operation is one of the exciting experiences of autoclave operation. The release of the trapped steam is accomplished by opening the valves on four 6-in. overhead pipe lines, two from each cylinder. The steam escapes through one large underground outlet, and from several smaller outlets at strategic locations.

The many safety devices for handling the quick release of steam are impressive. As an example, the timing, from the release of steam to the opening of the loaded autoclaves, is 10 min. Before this takes place, the opening of the hydraulically controlled doors passes through three distinct safety tests. The first is a check on the gauge registry of the existing pressure; the second is a spring pressure safety device that will not allow the door to be opened until there is less than ½-lb. of steam pressure in the vessel; the third is the release of the steel ring which releases each door to a point where any condensed steam is released from the interior. The doors are of the quick-opening type, and are operated by hydraulic rams.

Corrosion on the interior of the autoclaves has not been a factor of importance up to this time. The flow of steam through the autoclave is considered of importance. The intake is through two rows of 3-in. perforated pipe, anchored on the interiors of the cylinder, and set about 4 ft. from the bottom. The blow-down is accomplished overhead through the tops of the cylinders.

Handle Block in Trains Pulled by Cable

There is a marked difference in the handling of cured block in this autoclave installation as compared with many other installations. From each autoclave, a train of 15 loaded cars moves on a track across drawbridges, and is pulled by a cable which is operated by an electric motor driven winch. Loaded cars are moved to one of many unloading points along 606 ft. of 43-in. gauge railroad track with 30-lb. rails.

The curing penetration is uniform to all areas of the loaded cars, whether exposed or in the center of cubes. Subsequent tests indicate total hydration of cement has taken place, and the percent of contained moisture is well below specifications. The block are ready to be sent to the job site or the cubed block may be moved by lift truck to open yard storage.

The thinking behind this method of handling involves a number of economies that seem to be at the very heart of investment judgment. Rail car transportation permitted a better capacity use of the autoclave space. At present, the autoclaves are operated on three

One of the shovels loading in the quarry with washing and screening plants in the background. Stockpiles of washed stone are in the foreground

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. . . makes every operator a Samson!

This new body by Cresci provides the energy for one man to unload a complete shipment in a matter of minutes with no breaking or chipping.

All mechanism is overhead allowing for a clear platform at all times. The load rides on the overhead boom. The body comes in both three and four-ton capacity.

The blocks can be turned on a swivel to facilitate stacking and close operation or lowering into excavations.

The sides are clear for easy loading and the rear posts are movable for maximum rear loading.

This all hydraulic operation has dual controls on the side of the body and a non-jamming safety factor. Power takeoff operated, the Cresci Self Loader boasts low maintenance costs. Simple in design, fast in operation, it helps speed deliveries.

Rugged and Flexible . . .

Help build your profits by using this strong, easily operated aid to speedy operation.

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Left: *"Tepee" over raw ground shale. About one-fourth of storage is underground and three-quarters above ground. Reclaiming conveyor is below storage.* **Right:** *Showing burner platform and discharge end of rotary kiln with pit below. Clamshell takes material from pit and casts it toward the belt conveyor to screen house. From this open storage pile, the clamshell feeds grizzly over primary crusher with the throughs and crusher product going to conveyor inclining up to screen house; four sizes are produced*

daily cycles, two cycles on one and one cycle on the other autoclave. This is all that is required to take care of the 18,000 daily block production. However, the full potential under this method can be stretched to a 43,000 block production, a feat that would would appear impossible for two autoclaves to be handled under other load-charging methods.

The advantage of being able to move production immediately to job use, and to eliminate the need for expanded storage space, as well as additional handling, is an obvious saving. The old bug-bear of many block operations of being cramped for space is alleviated, if not entirely removed. Both the expense of labor and equipment are reduced.

The train idea was evolved after acquiring a sufficient number of wheels, axles and brackets from an abandoned coal mining operation. Plate steel pallets, 40- x 48-in., four to the car, were fashioned into a bed which supports 480 standard 8- x 8- x 16-in. block or equivalent. The 15 cars in the train, therefore, carry 7200 block which fill each autoclave to its full capacity. Special greasing for car wheels has been employed to take care of extremes in temperature.

Autoclaved block have a uniform appearance with a permanent setting of color which are good selling points. Covered storage for cured block is not being agitated in this area as it is considered a matter of climatic conditions governed by the severity and length of cold weather which is not so prevalent in Tulsa. The vacuum process to create a further reduction in moisture can easily be added if it is considered necessary. The present rapid "blow-down" of the autoclaves has reduced contained moisture which meets all requirements.

Full utilization of autoclave capacity takes away much of the fear of carrying investment to a degree that would make it difficult to write it off in a reasonable time. A more rational view is held that giving the buying public further evidence of the desire of the concrete products manufacturer to constantly improve quality, and meet every reasonable standard of quality test, is one sure road to increasing prestige and greater product consumption.

General offices of the Chandler Materials Co. are in its own building at 1723 S. Boston, Tulsa. C. W. Chandler, son of the founder, J. M. Chandler, who died in 1950, is president. Leonard L. Jones, who is vice-president and treasurer, has spent all of his business life with the firm, having joined it 18 years ago. James M. Chandler, vice-president and secretary, is the son of the president. In addition to overall supervision, the officers of the company give special attention to individual segments of the business: the sand and crushed stone production by the president, C. W. Chandler; the block and pipe manufacture by vice-president, Leonard L. Jones; and the expanded shale aggregate plant by vice-president, James M. Chandler. The office force numbers 14 people, and the total number of employes of all plants is 166.

The growth of this concern, and particularly its concrete products operations, reads like a novel. Some years ago the management found the heavy excesses of fine aggregates were accumulating for which there was no sale. They were actually making outright gifts of this excess to the railroad which served the plant. They went into the block business to "use up" these tailings.

That would most likely be the situation today without the consumption of those aggregates by the concrete products department because the aggregate production also has increased.

Construction of more storage bins for aggregates and cement is just beginning. A third block machine, and another pipe machine will soon be added. An additional seven acres of land next door has been purchased to provide space for future expansion.

Adds Block Machine

MARIETTA CONCRETE CORP., Marietta, Ohio, has added concrete block to its line of precast concrete products at its Hollywood, Fla., plant. The new facility incorporates the latest model Besser Super-Vibrapac block machine and a steam curing system. Block output approximates 1000 units per hr.

Attractive general office building in Tulsa, Okla.

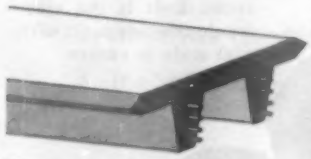
Big Profits!

WITH Form-Crete*

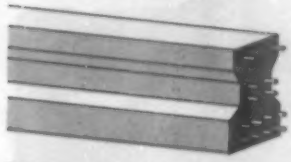
PERMANENT STEEL FORMS

...for casting multi-purpose concrete products

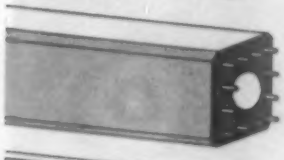
All "Form-crete" forms are manufactured from A.I.S.C. specifications high quality steel.



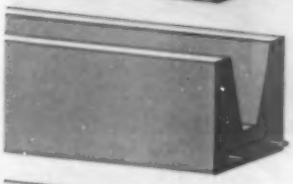
DOUBLE "T"—Steel forms for poured-in-place beds and all steel semi-portable beds. Also "Form-crete" Design Filler channels in 2" and 4" graduations.



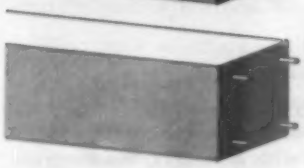
BRIDGE BEAMS—Full range of all steel forms for pre-stressed and post-tension "I"-Beams.



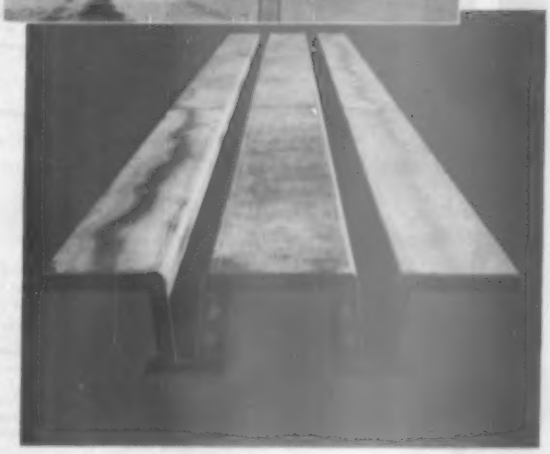
SQUARE AND OCTAGONAL PILING—Full range of steel forms including pallet liners and points.



HOLLOW LINTEL—Module block size allsteel forms with headers, long spans, or side by side gang assembly.



SOLID LINTEL—Module block size can be produced by "Form-crete" method in same forms as hollow lintels by removing center insert.



SHOWN ABOVE:
"Form-crete" DOUBLE "T" semi-portable all steel form.

*Trade name for Food Machinery and Chemical Corporation's especially designed, engineered and manufactured steel die-forms for moulding prestressed concrete construction units.

FLORIDA DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
P. O. BOX 1718, LAKELAND, FLORIDA

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MAIL THIS COUPON TODAY

SEND "FORM-CRETE" INFORMATION ON ITEMS CHECKED.

Name_____

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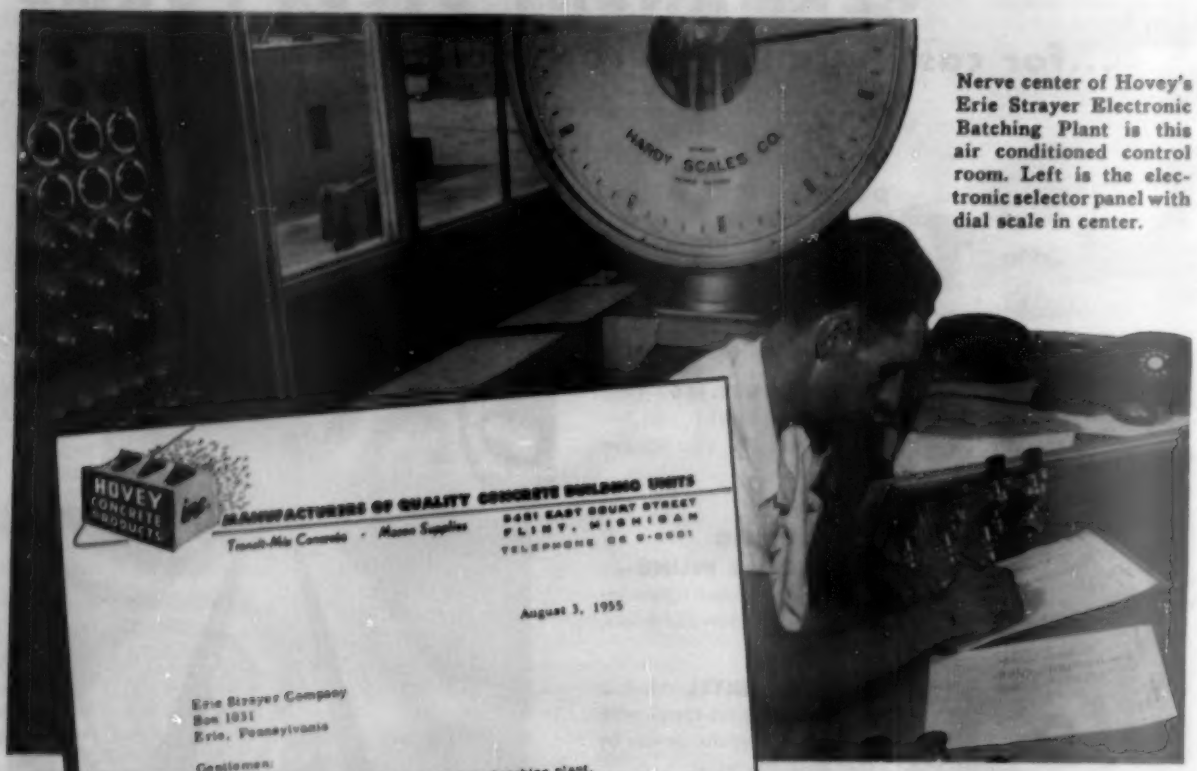
City_____ State_____

☐ Double "T" ☐ Bridge Beams ☐ Square Pilings ☐ Hollow Lintels ☐ Solid Lintels

Free—PRE-STRESSED FOLDER

ERIE STRAYER ELECTRONIC TRIPLES PRODUCTION AT



Nerve center of Hovey's Erie Strayer Electronic Batching Plant is this air conditioned control room. Left is the electronic selector panel with dial scale in center.

HOVEY CONCRETE PRODUCTS, Inc.

MANUFACTURERS OF QUALITY CONCRETE BUILDING UNITS

Transit-Mix Concrete · Mason Supplies

5481 EAST COURT STREET
FLINT, MICHIGAN
TELEPHONE CE 9-0001

August 3, 1955

Erie Strayer Company
Box 1031
Erie, Pennsylvania

Gentlemen:

Prior to the installation of our electronic batching plant, we were forced to re-handle 86% of our material through stock piles. We had a plant capacity of about 40 yards an hour.

Since the installation of our Erie bins and equipment, we have completely eliminated the re-handling of any of the material and we are now capable of producing 1,000 yards of consistent quality transit-mix concrete per day. We actually do not yet know our hourly capacity, but we have produced 150 yards in an hour's operation without taxing the plant.

We have found that the increased bin capacity, combined with the electronic batching controls, has increased our efficiency and capacity four times and decreased our operating cost to 1/4 of what it was previously.

Very truly yours,

Sherwin Palmer

Sherwin Palmer

SP:eg

Left: Sherwin Palmer, president, Hovey Concrete Products, Inc., tells about his company's experience with Erie Strayer's electronically equipped batching plant.

ERIE

BATCHING PLANT
HOVEY CONCRETE PRODUCTS

FLINT MICH. FIRM NOW ENJOYS THESE COST-CUTTING ADVANTAGES

1. **Output Up from 40 YPH to 130 YPH**
2. **Materials Handling Cost Cut 75%**
3. **It's Still a One-Man Operation**

Hovey, Inc. are volume producers of transit-mix concrete and concrete building units. Their customers demand fast service on specification concrete.

Early this year, Sherwin Palmer, president, bought an Erie Strayer Plant equipped with electronic controls for pre-set batching. At the touch of a button the operator can have any one of 5 different batches. All specifications are well within turnpike tolerances.

Mr. Palmer's letter, left, tells how this new plant has greatly increased production and cut costs.

You, too, can enjoy these important benefits. An Erie Strayer plant with electronic controls gives you complete control over your entire batching day. When your operator reports, he simply sets the controls for the batches he will need that day. From then on he merely pushes buttons. Electronics does the rest.

Electronic selectors can be installed to provide as many different pre-set batches as you need. Five—as in the Hovey plant—or any number to suit your requirement. And always, a flick of the switch puts you on pushbutton operation whenever a single special batch is needed.

General view of Hovey Concrete Products, Inc., Flint, Michigan. Plant was sold by Contractors Machinery Co., Detroit.

What about operating costs? It takes just one man to operate any Erie Strayer Plant—electronic or mechanical. Less current than that used by a 100-watt bulb operates the electronic control system. Maintenance is normally negligible.

And the electronically controlled plant has the same money-saving features that have made Erie mechanical plants famous: Quick, economical erection; Free flow of materials from bins to batchers; Faster batching and discharging cycle; Built to last but with all standard parts for easy replacement.

An Erie Strayer Plant with electronic controls soon pays for itself. Add up all its features, then ask yourself if you can afford not to "Go Erie—Go Electronic"!

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STRAYER COMPANY

New section of Bangkok, Siam. Monument to Democracy in concrete

• Trip around the world reveals progress in Europe, New Zealand, Australia and Singapore. Most of the Orient still employs backward methods

By ARTHUR C. AVRIL*

Concrete Progress Around the World

IN OUR TRIP AROUND THE WORLD, one of the outstanding things evident everywhere, was that in nearly all of the major new construction the most commonly used building material was concrete. We saw concrete hotels, concrete office buildings, concrete factories and to a lesser extent, some concrete residences in every country, including New Zealand, Australia, Singapore, Thailand, Ceylon, India, Iran, Lebanon, Turkey, Greece and Italy.

New buildings were made or built of poured concrete structures primarily. Occasionally, we would find some buildings which were built of some other basic materials and stucco, or covered with a coating of portland cement mixture. But in the main, the major construction was strictly reinforced, poured-in-place concrete. We saw no evidence of the development of precast concrete units as building units, but were quite favorably impressed with the development of the cement roofing tile industry, both in New Zealand and Australia.

It appeared that most of the roofing shingles or units in this construction were of the cement type rather than the clay tile.

Ready-mixed concrete transported in either transit mixers or agitating equipment has established itself very well in New Zealand, Australia and Singapore, but there is practically no evidence of it in the other places we visited. This was apparently due to the fact that the labor market was so extensive and economical that there were no real advantages in delivering ready-mixed concrete to most of the jobs and therefore, the industry did not have a chance to develop. It was interesting to see in New Zealand and Australia, particularly, how closely methods of operation in these two countries, even though they were on a much smaller scale, paralleled our methods in the United States. Aggregate producing plants in both countries were every bit as efficient as anything we have here. As a matter of fact, in the plants we saw at Aukland, New Zealand and Sidney, Australia, particularly, operating methods and equipment would compete with the best we have here.

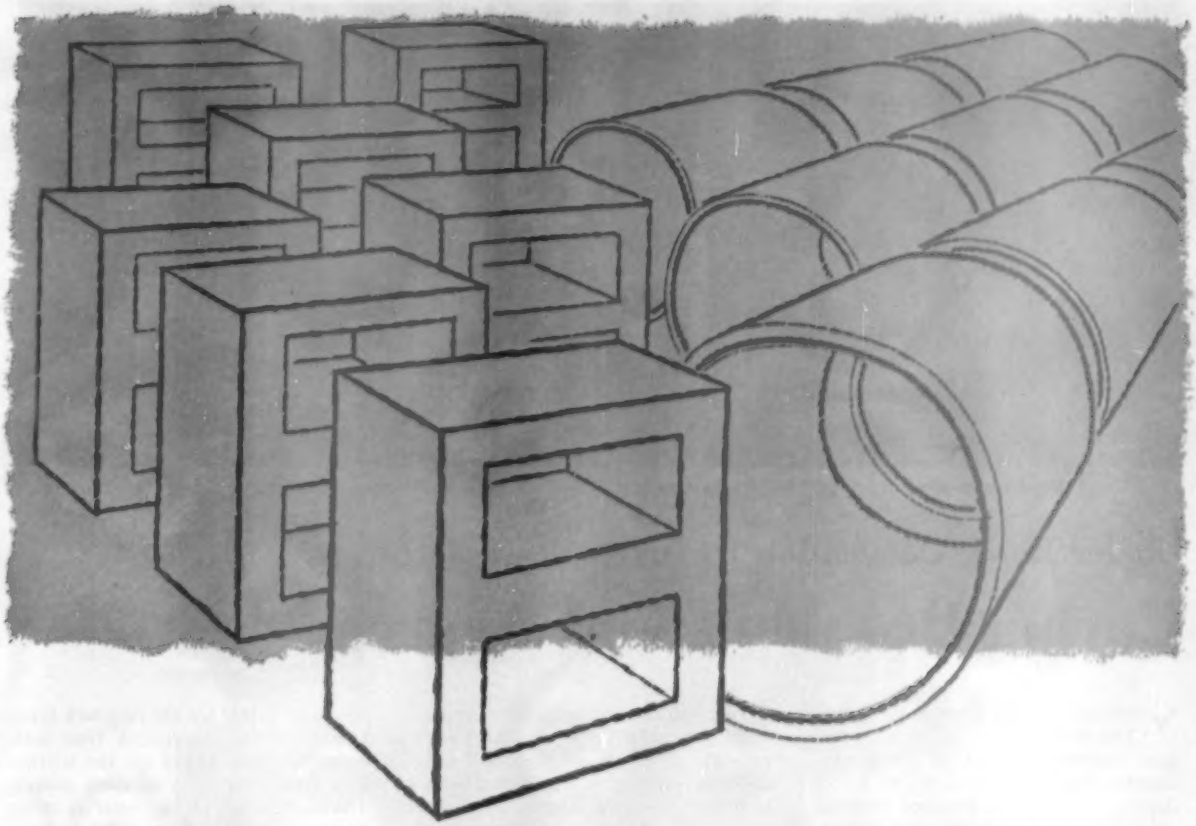
Quality control and the most up-to-date concrete technology is adhered

(Continued on page 212)

*Pres. Bakerete, Inc., Cincinnati, Ohio. Observations made in a trip around the world.

Malayan woman carrying concrete aggregate in baskets at Singapore

Mary and Arthur Avril at temple of Sleeping Budha



Increase output and quality

of concrete products with low-cost D-40

Let us show you how D-40 has helped other concrete products manufacturers make superior products, with a reduction in rejects, and at the same time increase production.

Economical D-40 plasticizes the "mix" to flow easier and more quickly into molds—filling out the corners and resulting in more perfect products. An added advantage is the reduction of abrasive wear on mixing and molding equipment.

Dry, granular detergent D-40 is easily added to the "mix" at the ratio of one to two oz. per bag of cement. Our experience is at your disposal. Contact any Oronite office for free sample of D-40 or ask for an Oronite detergent specialist to contact you.

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30 Rockefeller Plaza, New York 20, N. Y. • 20 North Wacker Drive, Chicago 6, Ill.
Mercantile Securities Building, Dallas 1, Texas • Carew Tower, Cincinnati 2, Ohio

Luncheon meeting of the National Cinder Concrete Products Association, Haddon Hall, Atlantic City, N. J.

Cinder Block Convention Discusses

Curing Problems and Aggregates

NATIONAL CINDER CONCRETE PRODUCTS ASSOCIATION, at its 32nd annual convention held at Chalfonte-Haddon Hall, Atlantic City, N. J., on August 8-10, 1955, featured sessions on lightweight aggregates and curing, merchandising and public relations, and machinery and equipment. Approximately 100 members and guests attended the meeting. H. H. Longenecker, association secretary-treasurer, presided.

A paper on "Progress in the Design of High Pressure Curing Systems" by William J. Shore, engineering consultant, was read in the author's absence. It was pointed out that reasons for the small number of autoclaving plants (less than 1 percent of all block plants) are the present high cost of autoclaves and the great demand for all types of concrete masonry products. Anticipating lower installation costs and greater competition, Mr. Shore feels that autoclaving will become of greater importance. Among advantages of high pressure cured block pointed out were uniform coloring, minimum shrinkage, high early strength, low moisture content, and marked reduction in material costs by replacement of up to 40-50 percent cement by silica flour, lime, and flyash and other pozzolans.

High Pressure Curing

Design improvements in doors, exhausting equipment, steam generators, and racks were discussed. Development of quick-opening doors has meant great time saving and has presented the possibility of more than two curing cycles per day. Newer doors also have greater safety features. Ring-lock and wedge-lock type doors were discussed; the former incorporates a lip-type gasket, while the latter has either a lip type gasket or a solid asbestos gasket. Door costs per foot diameter were reported as $1000 for the ring-lock type, $1100 for the wedge-lock type with lip gasket, and $1250 for the wedge-lock type with solid asbestos gasket. The higher cost of the latter is offset by eliminating frequent gasket replacement.

Modern exhausting equipment allows steam to be exhausted within 15-20 min. and without undue noise and disturbance to residents, and rapid steam expulsion effects a lower block moisture content and eliminates the head for condensing equipment, at a saving of about $15,000. In discussing vacuum stresses, Mr. Shore reported that installation of a vacuum breaker ($25 cost) makes steel rings or bands unnecessary, thus cutting the cost per autoclave of about $300.

Autoclave capacities have increased to a maximum of about 3000 block, with 10 ft. being the maximum diameter and 120 ft. the maximum length. Development of contour racks has increased autoclave capacity, but they generally require more time for loading and unloading. It was reported that a Chicago producer has designed a 7-tier rack having the same size as a conventional 6-tier rack, which has increased the capacity per 8- x 92-ft. autoclave from 2016 block to 2352 block and increased daily output of two autoclaves by 1344 units.

Mr. Shore also discussed the development of better provisions for accommodating expansion of autoclaves during operation. The best design, he claims, involves the use of nine steel footings, each riding on a series of

Left to right: Thomas Rogers, Concrete Specialties Co., Lyndhurst, N. J.; C. H. Carmichael, I. L. Stiles & Son Brick Co., North Haven, Conn.; Horace W. Bush, Multiplex Concrete Co., East Orange, N. J.; Russell B. Smith, consulting engineer, New York, N. Y.; and E. H. Brooke, National Brick & Supply Co., Washington, D. C.

Fully loaded Oshkosh 50-50 ready-mixed concrete carrier demonstrating short turning radius and excellent flotation while making 25 consecutive turns in soft beach sand at Idlewild Airport, New York, New York.

Oshkosh 50-50 ready-mixed concrete carrier with high level pouring spout eliminates double handling of concrete. Photo taken at New Penn Dow School, Alexandria, Va.

Never before has there been a ready-mixed concrete carrier like Oshkosh's FIFTY-FIFTY! Up to 5 cubic yard capacity means greater payloads — increased profits! Powerful 4-wheel drive traction lets you spot loads under adverse conditions . . . get jobs competition can't handle! Two driving axles means lower maintenance cost and its 144" wheelbase means greater maneuverability. Easy to service — just lift side panels for instant access to engine! Write for details and how you can have an on-the-job demonstration without obligation!

WRITE FOR FREE BROCHURE

This colorful, fact-filled book gives all the technical data and specifications of the new Oshkosh FIFTY-FIFTY ready-mixed concrete carrier. Write or wire for your free copy today!

OSHKOSH

OSHKOSH MOTOR TRUCK, INC.
OSHKOSH WISCONSIN

Left to right: R. G. Watson, Universal-Atlas Cement Co., New York, N. Y.; Theodore Lebo, Jr., N.C.M.A., Washington, D. C.; J. R. Belot, Belot Concrete Block Co., Tiltonsville, Ohio; and John M. Longenecker, Building Units, Inc., Primos, Penn.

hard surfaced self-aligning steel rollers. Special low friction alloy plates with grease grooves on the underside have been used with success.

Development of automatic package-type steam boilers has reduced manpower requirements and has cut autoclaving costs, he added. These boilers cost about 10 percent less than water-tube type units.

Mr. Shore concluded by discussing costs of high pressure curing systems. According to his figures, a system curing 5000 8-in. equivalent units per 24 hr. would cost $45,000 installed, and a 15,000 block per day system would cost $100,000. Thus, the installed cost per 1000 block per 24 hr. would vary from $6666 to $9000. This cost includes the autoclaves, quick-opening doors, steam generator with pump and tank, heat exchanger, exhaust blower and duct, all piping, valves, controls, and meters, piers, foundations, and complete engineering services.

Edmund H. Brooke, National Brick & Supply Co., Washington, D. C., whose company installed six autoclaves two years ago, said that autoclaving is especially important for a firm like National which markets as much as 90 percent of its output for commercial and institutional buildings, where the block are used in exposed walls rather than for backup. Mr. Brooke pointed out that whenever autoclaved block are introduced into a market area, intense competition may automatically result in price cutting. The producer of autoclaved products, however, should merchandise with the half-cent or cent price differential. He warned that it is unwise to guarantee masonry walls made with autoclaved block against cracking, because cracks may develop for other reasons.

Lightweight Aggregates

In a discussion of the availability of lightweight aggregates, Wm. G. Bower, Cinder Shippers, Chester, Penn., warned that top grade cinders are becoming scarce, and that even poorer grade cinders are becoming short in supply. However, as a bright spot in the future, Mr. Bower discussed the possibility of reclaiming natural cinders from burnt-out anthracite-shale waste piles in eastern Pennsylvania. Block made from this material weigh 32 lb. (8-in. equivalents) and have tested 1000 p.s.i. in four days. These cinders have a reddish tinge, but the color is not imparted to the block. A major drawback is the extra expense in handling due to the presence of large clinkers (some as big as a house), which will have to be blasted. Mr. Bower believes that this source of supply will not be tapped until conventional cinder sources are exhausted.

Talks on expanded clay/shale aggregate were given by Russell B. Smith, consulting engineer, New York, N. Y.; Allen R. Rowen, Dwight-Lloyd Division, McDowell Co., Cleveland, Ohio; C. H. Carmichael, I. L. Stiles & Son Brick Co., North Haven, Conn.; and Richard E. Miller, Lehigh Materials Co., Lansford, Penn. Mr. Smith, a pioneer of lightweight concrete construction and designer of sintering machine plants, is affiliated with the Koppers Co., manufacturer of ore sintering machinery. He discussed the merits of straight grate-type and revolving table-type sintering machines vs. rotary kilns for production of expanded shale/clay. Using pilot models, Koppers has sintered flyash and has also made a pelletized lightweight aggregate which apparently is suitable for monolithic concrete as well as block. Mr. Rowen stated that his company, designers of turnkey sintering plants for the lightweight aggregate industry, has also successfully made pelletized aggregates and has sintered flyash in pilot plants. It was pointed out that flyash is a good potential raw material for lightweight aggregate production, since (1) the material is almost 100 percent self-sintering (making fuel practically unnecessary) and (2) supplies are abundant in many metropolitan areas, where the demand for block is greatest.

Sintering plant operating experience was discussed by Mr. Carmichael and Mr. Miller. Mr. Carmichael's company operates a 44-ft. traveling grate-type machine producing 21½ cu. yd. of expanded clay aggregate per hour. The material makes a 27-lb. 8-in. block with a yield of 26 block per sack of cement. The Lehigh Materials Co. plant, described by Mr. Miller, incorporates three sintering machines producing 550 tons daily; the expanded shale product is used in both block and monolithic concrete.

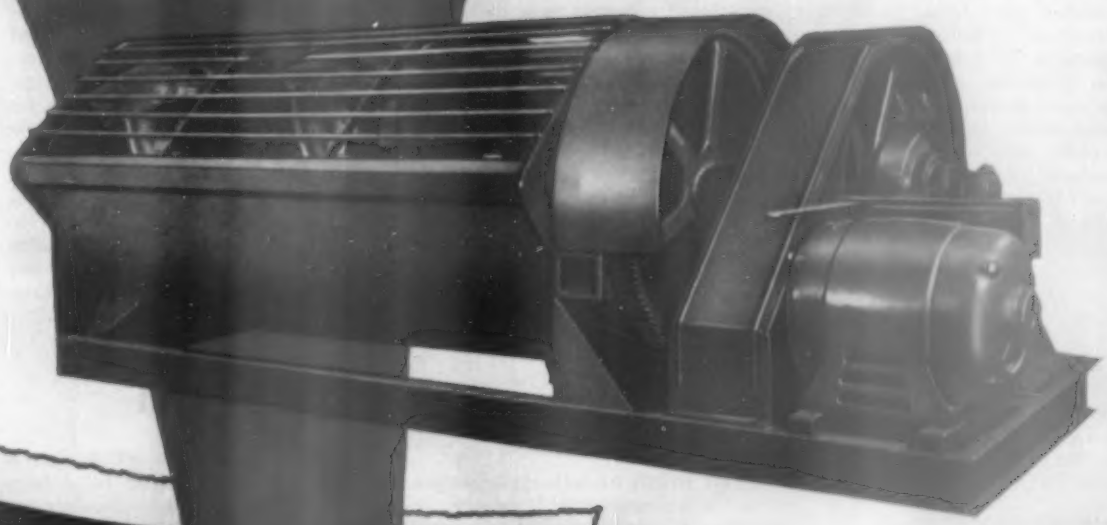
Advertising—Promotion

Advertising and promotion were discussed by R. Loran Langsdale and Loran B. Langsdale, Langsdale Advertising, Baltimore, Md., and publisher of the association monthly magazine, "Cinder Products News." It was pointed out that although the future for concrete block is encouraging, there is need for a continuing merchandising program to keep the market sold. Furthermore, constant turnover in customers means a continuing promotional program.

In the absence of representatives of Cinder Block, Inc., Detroit, Mich., Mr. Langsdale described the advertising program his company has developed for the Detroit firm in conjunction with its converting to high pressure curing this summer. The program was started with the initial autoclave plant construction, and is being continued through the plant opening in October of this year. The purpose of this early promotion was to condition Detroit architects and contractors to the advantages of autoclaved products even before the products were placed on the market. Advertising media used included several local newspapers, architectural and contractor magazines, and leaflets; and the company is working up a colorful brochure which will describe the autoclaving process and point out its advantages.

Brochures recently developed by other producers were also discussed. One brochure was 24 pages long and described the company's entire plant operation and listed all products manufactured or handled. A recent survey of association members relating to promotional methods revealed that novelty advertising (calendars, rulers, pencils, etc.) ranked first in use, followed by local newspaper advertising. Some producers reported local newspapers running special articles on their plants, in some cases tying in the story with advertising. Use of the association newsletter for advertising was ad-

ALL MIXERS LOOK ALIKE



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vocated. Many companies distribute this newsletter throughout their market area. One producer reported holding an annual open house at which several hundred architects, engineers, contractors, etc. were invited. Another producer promotes block through building model homes. Landscape gardeners and interior decorators collaborate to make these homes attractive. One producer told of capitalizing on the Yucca Flat atom bomb tests by promoting bomb-proof houses.

Advantages of calendar advertising were discussed by representatives of Brown and Bigelow, St. Paul, Minn. An outcome of the meeting was the decision of the association to sponsor upon a cooperative basis with members a 12-sheet advertising calendar for 1957. Each calendar will feature attractive lightweight concrete masonry construction in color, and will include individual company advertising.

Equipment Developments

At the concluding session, representatives from several manufacturing firms discussed block plant machinery and equipment. Block machinery was discussed by Jack Franklin, Besser Co., New York, N. Y., and Walter S. Giddings, Lith-I-Bar Co., Atco, N. J.; steam generators by Wm. C. Stahl, Clayton Mfg. Co., El Monte, Calif.; dump-type block unloaders by W. S. Phillips, A. Rehberger & Sons, Inc., Newark, N. J., and M. J. McCrink, Adam Black & Sons, Inc., Jersey City, N. J.; and hoisting-type block unloaders by George L. Kramer, Side-O-Matic Unloader Corp., York, Penn., R. W. Schlenker, Builders Equipment Co., Phoenix, Ariz. (Superlite Unloader); Harold R. Lehman, Haverstick Bros., Lancaster, Penn., (Hydra-Lift Unloader); J. L. Russell, Russell Mfg. Co., Haddon Heights, N. J. (Hydrahoist Unloader); and Paul Cresci, A. Cresci & Son, Vineland, N. J.

Mr. Franklin reported that his company is conducting a one or two week school for block plant operators. One week is devoted to design of mixes, plant operation, sales, promotion, etc., and the second week to maintenance of block machinery. Mr. Stahl discussed the use of automatic package-type steam generators in the industry. He stressed the importance of buying the proper size unit. Chief advantages of modern steam generators, he pointed out, include compactness, ease of operation (automatic), rapid generation of steam, safety, fuel economy, and low maintenance. In a discussion of water treatment, the importance of dealing with a reliable chemical firm having good service men was stressed.

Advantage of mechanical block unloaders were pointed out by representatives from the seven unloader firms. These included rapid unloading (in some cases less than five minutes per truck load) reflecting more daily payloads per truck, less block breakage and chipping, ability to unload to basements and cellars (in the case of the hoist-type units), and adaptability to handling other building materials if palletized. One speaker stated that one unloader truck can replace nearly three flat bed trucks. Two dump-type unloaders (one roll-off and one slide-off) and five hoisting-type unloaders were described, six of them involving end unloading and one, which incorporates a central crane and rotating boom, also permitting side unloading.

Brief reports were given by E. W. Dienhart, N.C.M.A., Chicago, Ill., and Theodore Leba, Jr., N.C.M.A., Washington, D. C. Mr. Dienhart discussed the recent N.C.M.A. board of directors meeting in Colorado Springs, Colo., and Mr. Leba reported on his activities in Washington. Mr. Leba also described a recent 8-week lecture tour of all U. S. division offices of the Corps of Engineers. Appearing before engineers and architects from all district offices, he discussed "Application of Crack Control Measures in Military Structures of Concrete Masonry Construction."

Concrete Progress Around the World

(Continued from page 206)

to very strictly by both aggregate producers and ready-mixed concrete operators. Re-combination of split aggregate sizes is a common practice in the ready-mixed concrete industry in both countries. The result is that concrete is delivered to jobs with the proper consistency and has ideal workability to give the best possible results.

This is undoubtedly greatly responsible for the care exercised in the production of aggregate because material is being sized as carefully as the best units would do it here.

Even though we didn't see very many major construction projects when we arrived in Singapore, due to the fact that we were there only a couple of days, we did, however, see some interesting sights with regard to batching and handling of materials. This was the first contact we had with material handling methods in the Far East and we were astounded to note the crudeness in which everything was done because it was a hand-labor operation from beginning to end. As a matter of fact, the old balanced oriental baskets took the place of wheel barrows for transporting concrete aggregate from the supply pile to the place where it was being mixed.

Beginning with Singapore, we saw very little modern construction equipment being employed. Except in Ceylon, the economy of which appeared to be on a very sound basis, methods here were a mixture of the old and the new. Thailand was the next most progressive country we visited in the Far East, and the most backward, from a construction standpoint, appeared to be India. Here, roads are paved virtually by hand—the aggregate being transported from the stockpiles back to the road in baskets. The spreading of the material is strictly a hand operation and just before the application of a blacktop surface—which again is distributed and placed by hand, large crews of women and children are employed to hand-brush the road base to prepare it for the blacktop surface. The most modern piece of road equipment we saw was a 1920 version of a steamroller.

In both Greece and Italy, war reconstruction is primarily in concrete. The Greeks appear to have done a better job faster and more economically than the Italians, but we did see excellent reconstruction results in northern Italy, particularly. The Italian picture leaves one with the impression that new accommodations had to be built for the population, but the old rubble and ruin was not to be disturbed and should remain as they were immediately after the war in order to act as a monument which could be dedicated at frequent intervals and give the Italians an excuse to have a parade.

As a matter of fact, the two and a half weeks we were in Italy we encountered four "Liberation" days. Each time our troops landed in a different place, it was necessary to celebrate the occasion with a "Liberation Day."

There was an outstanding bit of reconstruction work which we saw in Italy and that was some financed by the Marshall Plan. This was the excavation of as much of Pompeii as had been excavated prior to World War II. We were told that this money was allocated to the excavation of Pompeii because when the Germans had occupied that area, they stored some ammunition and shells just outside the walls of Pompeii and we, of course, in order to neutralize the value of ammunition in this make-shift arsenal duly bombed it and in the process knocked some of the ancient plaster off the walls of Pompeii and did damage a few of the walls very slightly.

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A STRIKE—Lessons for the Future

35: A producer views the ready-mixed concrete business. The strike settlement in Toledo, Ohio, reveals the need for a more effective negotiation procedure by management

By JAS. A. NICHOLSON*

A STRIKE BY THE TEAMSTERS UNION against the Toledo, Ohio, building supply industry (building supply people, ready mixed producers, and block manufacturers) began on Tuesday, June 14, when drivers failed to report for the opening round of deliveries. A strike settlement was reached at 1:00 a.m. on Saturday, July 1, after an unbelievable final session that began at 2:00 p.m. the previous day. A condition precedent to the settlement called for drivers to be paid for the July 4th holiday in spite of the fact that the strike had unquestionably prevented any employee from qualifying for holiday payment.

The principal performer in the final conference was the local union's comparatively new president who was participating in his first bargaining session with us even though negotiations had begun on April 21. The 11-hr. long meeting was a grand performance in spite of the fact that the whole affair could have been easily completed in an hour's time—but the act had to go on.

This three-week work stoppage of 14 operating days, while only directly affecting approximately 350 drivers and plant men, had thrown several thousand building tradesmen out of employment.

The industry had been operating under a labor contract which had expired on May 15. Approximately 45 days prior to the expiration date, the union had sent the employers a completely new proposal (practically amounting to an ultimatum—until the Federal Conciliator had entered the picture, no modifications had been conceded) that was basically patterned after the area "over the road" haulers contract. The proposal also contained certain clauses that reflected the CIO training of the new president of the Toledo local. In addition, there were several demands arising out of local grievances.

The pattern demands included an increase in welfare payments, a new and still unexplained pension plan, a four weeks' vacation proposal, and tough clauses on union security, hot cargo, leased equipment (including permit holders) and a guaranteed 8-hr. day for men put to work.

Clauses with a CIO background or otherwise unclassified included credit union deductions, co-management status, super seniority, and extra pay for stewards, stewards allowed to roam plants on union business at own discretion, pay for sick leave, extra pay for afternoon or evening shift, and union determination of employes' complaints.

Demands that arose out of industry grievances included changes in vacation qualifications, a new inflexible work week schedule, time off with pay (5 days maximum) for funerals, a week's notice of lay off or pay in lieu of notice, preference to top seniority men on all overtime, supervisors forbidden to do union employe work, taking lunch period within 5 hr. of report time or double pay for rest of day, and a proposal that employers provide clean lunch rooms and rest rooms with hot and cold water, and individual lockers for all employes.

In early labor contract negotiations attended only by representatives of the companies and the union, labor representatives had refused to make one concession to their original demands. These early negotiations had included a new twist for Toledo bargaining—the union had insisted upon the presence of stewards of principal companies at all labor contract sessions. The original proposal had even contained a demand that companies pay stewards for time spent in contract negotiations. With the Federal Conciliator participating in the later bargaining sessions held shortly before the expiration date of the old contract, negotiations were held to a snail's pace by the union, which was in the process of effecting a contract settlement with area lumber dealers.

On June 1, our industry was put in a most disadvantageous bargaining position when the lumber people agreed to a contract embodying most of the demands that were contained in the building supply proposal. With the lumber settlement out of the way, the union became most insistent— "accept a comparable contract or take the consequences" became the union attitude. Undoubtedly, the union had expected that the signing of this closely related agreement would shortly force the capitulation of all the local building supply companies. Instead these firms quickly let the union know that they were united in resistance to unreasonable contract demands.

At the final bargaining session held before the strike started, the union lost no time in telling the companies that they had the choice of either accepting the union demands (still at issue) exactly as written by 4:00 p.m. of that day or stand a strike. The companies notified the union that they were willing to negotiate the issues, but that a blanket "yes" was out of the question. Upon receipt of this statement, the union representatives—all 12 of them—promptly walked out of the mediation meeting which had been called by the Federal Conciliator and the Toledo Labor Management Committee. Several days later employes at all Toledo plants failed to report for work. The strike had begun.

The six demands that were still in controversy when the strike was called included the wage increase proposal, guaranteed 8-hr. day for men put to work, guarantee of lunch period within 5 hr. of reporting time (men to be paid double time for balance of day if men did not get lunch period on time), four weeks' vacation, a pension plan, and a leased equipment clause that applied to both owner operators and state permit haulers.

The strike, as expected, was a costly one. In spite of newly won wage increases and added benefits, it will take sometime for the men to recover what they lost when they were out of work. Employers wound up with the highest wage rates in Ohio and some new and perplexing operating problems which will continue to cut down profits and lessen efficiency.

In the new contract, the union got as much as could be expected on wage increases, lost the guaranteed 8-hr. day, compromised the noon period demand, settled for three weeks' vacations, gave up on the pension plan, and agreed that the leased equipment clause applied only to owner operators. In the final session that ended the strike, the companies agreed to make credit-union deductions (a non-economic demand) and accepted a change in vacation eligibility requirements, allowing low seniority employes of one

*Pres., Nicholson Concrete Co., Toledo, Ohio

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or more years standing to get partial vacation benefits (based on a new monthly determination plan).

The August issue of *LABOR UNION WORLD*, a monthly newspaper published by Local 20, International Brotherhood of Teamsters, carried black headlines announcing that our striking truck drivers had won a 55¢ package boost. The story said that the increases varied from 50¢ to 60¢ per hour, based on differentials in job classifications and the elimination of inequities between various firms of the city.

Of course, the strike was built up to be an outstanding union victory. I doubt that many of our men actually shared this optimistic viewpoint. On a three-year basis, our ready-mixed concrete drivers could have gotten 12½, 12½ and 10 without a strike. The strike settlement called for 14 cents in 1955, a second 14 cents in 1956, and 10 cents in 1957. This comparison indicates strike gains of 1½¢ in 1955, and 3¢ in 1956 and 1957. Another gain was partial vacations for part time employes who have been on the workers list for a year or more. The new contract provided some adjustments in work classifications, most of which did not apply to ready-mixed concrete producers. The principal objective of the union on wage reclassification was an upward adjustment for fork lift operators in the concrete block industry. The final settlement provided for no such adjustment.

In the third week of the strike, employes had been showing definite signs of wanting to go back to work. Weekly checks were being missed. The union was refusing requests of its members for an employes' meeting. The union began to experience difficulty in giving employes the brush-off on these requests. With the pressure on, some of the union agents were arranging meetings with industry officials who were not on the bargaining committee.

The employers' position was in turn being weakened by the willingness of certain industry executives (not represented on the negotiating committee) to meet on the quiet with union agents to discuss possible terms of settlement. Any consideration of terms over and above those offered by the employers' bargaining committee unquestionably had the effect of only raising the union demands. Whenever the Federal Mediation Service has entered into a negotiating picture, management, under no conditions, should consider a meeting with labor representatives unless the Federal Mediator is present. If management is willing to better its offer in any way, it should give its proposal to the Mediator. A Mediator can only be helpful to management when company representatives have some trading stock left. No company official should ever agree to a meeting on his own when the negotiations have been turned over to a bargaining committee. In the first instance, labor, to its own advantage, will tip the mediator that such a meeting has taken place. Secondly, any consideration of terms and clauses over and above the committee proposal will be thrown into the teeth of its members when regular bargaining sessions resume.

● *There is a labor relations book that I think should be read by every ready-mixed concrete producer. This suggested book is titled "Successful Labor Relations for Small Business." The authors are James M. Black and George Piccoli, executives of the Associated Industries, Cleveland, Ohio. McGraw Hill is the publisher.* —Jas. A. Nicholson

There is no sense of industry companies permitting labor relations to go to the point of a strike unless they are completely prepared to stick it out together.

When an industry is on strike, all thinking and all action should be collectively handled. This is no time for "individual thinking out loud." Any kind of an individual commitment is a death blow to management's position.

In our Toledo strike, both employers and union agents were seeking a mutual face-saving compromise. With the men wanting the July 4th holiday payments so badly, union representatives knew that a speedy strike settlement would be generally popular. Management recognized this wish on the part of its employes as a one time expense item that could be used as a wedge toward breaking the tie-up.

Labor representatives have called the Toledo strike a union victory. Others might feel that the employes gained little that could not have been obtained through continued negotiations. In my opinion, the strike was a mistake—a lesson to employers and employes alike. I don't believe that the new union officials showed effective leadership in taking the men out on strike. I'm certain that management executives weren't properly prepared for bargaining table duties and that collective action taken during the strike wasn't a good example of management efficiency. I sincerely regret that our negotiating committee didn't adopt and maintain a strong "no" position on union demands involving protection of rights, hot cargo and leased equipment.

Future Contract Negotiations

The labor situation is one very important reason why all ready-mixed concrete producers should belong to the National Ready Mixed Concrete Association. Our national office is a constant source of reliable and authoritative information as to what our whole industry is doing in its dealings with labor unions. Producers who operate non-union plants are kept advised of developments because these operators need to be just as well informed as employers who now have to deal with unions. Four times a year reports are issued to all members sectionally showing rates of pay, hours of work, and conditions of employment. Two times a year reports are issued on employe benefit programs.

The national headquarters has periodically published a collective bargaining manual titled "Standard Clauses for Labor Agreements in the Sand and Gravel and Ready Mixed Concrete Industries." In this manual, standard clauses are set up for contract agreements. With these clauses, producers can make proposals and demands of their own in collective bargaining, not simply sitting by and letting the union boys do all the demanding. The clauses, couched in fair legal language, help to put the producers on a more equal footing with the union representatives. Producers who have succeeded in getting these clauses into their contracts have been able to establish reasonable agreements with labor unions.

The national office is prepared to analyze present and proposed labor agreements for member companies. Upon request, new labor demands are given close scrutiny, pitfalls are pointed out and carefully considered recommendations are suggested. The Association's counsel speaks at the annual convention on labor problems. In addition, throughout the year, members are sent memorandums which touch on specific legal problems arising out of collective bargaining.

The National Association has a well established and functioning program for assisting member companies in the handling of management-labor relations. Association officials are alert to the new pattern demands that the Teamster Union is throwing at our industry. To meet this new threat, association officials realize that the labor counseling service will have to be improved and enlarged.

The importance of management-labor relations calls not only for enlargement and improvement of the

(Continued on page 218)

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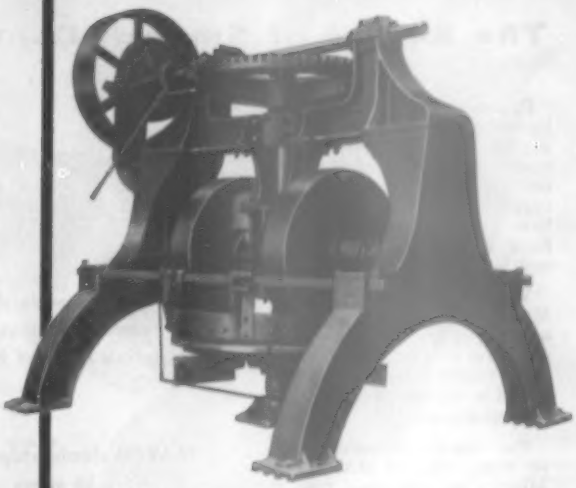

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- Horsepower required — 35 H. P.
- Speed of 48" clutch pulley — 150 R. P. M.
- Floor space — 12'8" x 11'2"
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STRIKE LESSONS

(Continued from page 216)

labor services of our national association, but also for a more active participation of all state and area associations in collective bargaining problems. Few associations are now doing a good job on labor matters. Industry groups in Southern California and Northern California are notable exceptions. Efforts of these groups should be studied and either copied or improved. I think so highly of the work of our West Coast brethren that I'm convinced that if their work was being duplicated all over the country our industry would now be in a much better position to successfully combat the pattern contract plans of the Teamsters.

As Vernon E. Lohr so clearly pointed out in a talk titled "Area Bargaining in Southern California" (presented before a joint session of the National Sand and Gravel Association and the National Ready Mixed Concrete Association) that while local conditions in Management-Labor Relations may vary, the basic problem is always the same—union pressure and management resistance to that pressure.

In that excellent Chicago talk, Lohr discussed early labor contract negotiations by companies' principals, mounting pressure of time, and "on the spot" decisions, realization that union representatives were negotiators who had ample time and whose specialty was labor negotiations 12 months of the year, and recognition of the need for a well balanced Labor Relations Committee or Team to whom top management could delegate responsibility for negotiations, contract administration and handling of grievances. Plans for a proper functioning committee were promptly made.

Full and complete consideration was given to the objectives, personnel and negotiating procedures of the new group. Committee members were carefully chosen, sufficient time for study, preparation and negotiations was allocated, and the committee, within prescribed discretionary limits, was given full authority to negotiate.

Today, Southern California producers have able representatives at the bargaining table. Early shortcomings in negotiating procedures have been eliminated. Carefully considered management proposals are counteracting aggressive union demands. Union pressure is facing unified company resistance.

Neither the National Ready Mixed Concrete Association nor all the state associations can do the job that must be done. That job can only be done by

(Continued on page 220)

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BP-12

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Name _____ Title _____
Company _____
Address _____
City _____ State _____

the individual ready-mixed concrete producer.

The average producer has been doing nothing or little to help himself. He doesn't belong to an association (state or national) or if he does belong, doesn't aggressively participate. Unless individual producers coordinate efforts with other nearby producers and with ready-mixed concrete operators in the state and nation, our industry will be unable to resist the impact of regional labor contracts. The individual producer who isn't prepared will be helpless when the union stops at his plant.

In Ohio, less than a half of the ready-mixed concrete companies belong to the national association; barely a majority belong to the state association, which has recently expanded its activities into the labor field. Nonmember companies probably run correspondingly high in other parts of the country. I am hoping that these several articles on Labor Problems will alert producers everywhere to the importance of membership in the National Ready Mixed Concrete Association and in their particular state association. Unquestionably, unless producers get together and stick together, they will individually have to take what the union hands them.

In a letter to me that dealt with the importance of labor problems, Vincent P. Ahearn, executive secretary of the National Ready Mixed Concrete Association, among many fine statements, had this to say: "I believe that group bargaining in our industry, particularly in metropolitan centers, is an essential of our survival. Without group bargaining, powerful labor unions can isolate one or more companies in the area, strike them and force them to accept the union's terms or lose their businesses. When this occurs, the remaining companies, permitted to operate while the union casually picks out one or more companies to defeat, will find themselves confronted with an accomplished fact which they must accept. Sometimes the union technique is to strike all but one company, in the interest of keeping other A.F. of L. unions from complaining that their men are being laid off by contractors and sub-contractors because of a dispute in which they are not involved. The union will always assure the one or two companies permitted to operate that they will see to it that they get all the business in the market. This is a tempting proposition and the union can really deliver on its promise, but we should all hope that wherever there is group bargaining in our industry, the companies will stand as one unit in fighting off union de-

(Continued on page 221)

STRIKE LESSONS

(Continued from page 220)

mands which would make it impossible for us to operate."

"When I say that group bargaining is essential in most cases to our survival, I don't mean that the present status of group bargaining in our industry is not open to substantial improvement. In most cases, the group bargaining is not well organized or even organized at all. The job is haphazardly done and the producers come together only when a contract is about to expire and the union is looking down their throats with a strike threat. There is no preparation by our producers for the collective bargaining ordeal and no attention is paid throughout the year to the very important requirement for intelligent administration of the contract. One producer will agree to an interpretation of the contract by a union business agent and then the other producers in the area have no choice but to accept that interpretation. Procedures must be set up, not only to prepare for collective bargaining, but also to supervise the administration of the contract during its existence." .....

In future labor relations of our industry there is one trend that is unmistakably clear—the determination of the Teamsters to cease local negotiations and negotiate either on a statewide basis or, more preferably, on an area (number of states) wide arrangement. The Teamsters are centering their power in regional officers who "call the shots." Contracts with "over-the-road" haulers are already on a widespread area basis. The same type of negotiations is planned for our industry. I doubt that the local Teamsters ever intend to negotiate another contract with Toledo producers.

The move to an area contract seems to be planned for 1958 or shortly thereafter. 1955 agreements made in high wage cost centers are generally 3-year contracts with standard wage increases of 10¢, 10¢ and 10¢; four weeks' vacation; a pension plan; and a number of other proposals (see Toledo demands). In communities where "below par" wages prevail, producers are being handed one or two-year contracts with demands averaging higher on both wages and fringe benefits.

Teamsters demands are beginning to include "out" clauses that will permit area regulations even before the expiration date of some contracts now in effect.

Appendix A of the Teamsters' original demand on Toledo producers contained this clause:—"In the event a statewide agreement is entered into by and between the Labor Division of

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Just thought you would like to know about this.

Sincerely yours,

W. E. Beck and Son

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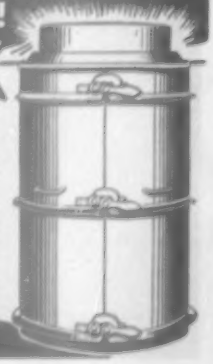

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ROCK PRODUCTS FEATURES TIMELY INDUSTRY NEWS EACH ISSUE

the Ohio Contractors Association and Locals of the Teamsters union, then the parties hereto agree that any wage classification that may be higher than those here agreed will be paid on that job."

This clause which was rejected by the bargaining companies is quite mild in comparison with the demands made on some producers. A clause in a Teamster Illinois proposal really spelled out the pattern plans of Dave Beck, the union president.

"The employer parties hereto agree that upon receipt of written notice from the union they will participate in collective bargaining negotiations for a Central States Area Agreement or an Illinois Area State Agreement and will be bound by such terms and conditions as may be agreed upon for the Central States Area or for the state of Illinois or any part thereof. The above contract shall be automatically superseded by any such agreement, the terms and conditions of which multi-state or state area agreement shall become effective upon the date of consummation thereof irrespective of any provision in such multi-state or state agreement with respect to retroactive application of any of its terms.

"The Union acknowledges the right of the employers or their representatives to participate in such negotiations and accepts the responsibility for notifying the employers or their representatives of the pendency of such negotiations."

Member companies of the National Ready Mixed Concrete Association have been advised that such a demand is illegal. In spite of this opinion, a number of producers facing a strike threat, may accede to the proposal. Certainly the "over the road" haulers have already capitulated to union pressure on this point. Truckers who haul cement to Toledo and other Ohio plants have signed area agreements. I wonder what will happen if drivers of cement trucks should refuse to deliver to Toledo ready mix companies unwilling to accept state-wide contracts.

The Teamsters Illinois demand is certainly a complete confirmation of my pattern statements made in the recent article "Labor Negotiations and Trends." Producers now have the union's word for it that they face the problem of multi-state agreements. Wherever it has appeared, the area clause is only one of many harsh demands. Actually, a number of ready mixed concrete companies might not be able to operate profitably under the union's terms. Many producers in the not too distant future may have the choice of accepting the union's ultimatum for an area agreement or going out of business.

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- ___Dump Bodies*
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- ___Electric Motors
- ___Engineering Service, Consulting and Designing
- ___Explosives & Dynamite
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- ___Hoppers
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- ___Locomotives*
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- ___Mills*
- ___Pipe*
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- ___Screen Cloth*
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- ___Speed Reducers
- ___Tanks, Storage
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- ___Torque Converters
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- ___Trucks, Bulk Cement
- ___Trucks, Industrial
- ___Trucks, Mixer Body
- ___Trucks, Motor
- ___Valves
- ___Vibrators
- ___Welding and Cutting Equipment
- ___Winches
- ___Wire Rope

If equipment you are in market for is not listed above, write it in the space below.

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Your Name _____ Title _____

Firm Name _____

Street _____

City _____ State _____

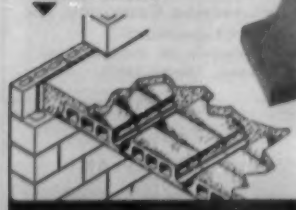
CP 10-55

MORE PROFIT FOR YOU with SOFFIT BLOCK

(Floor Filler Block)

Modern Soffit Filler Block floors and roofs meet building code standards . . . endorsed by architects and builders . . . ideal for radiant heat systems . . . many other advantages!

MAKES FLOORS and ROOFS permanently FIRESAFE, RIGID, ECONOMICAL!



Section of Soffit Filler Block floor, showing integral joist and slab of reinforced concrete.

You can make them on this BESSER VIBRAPAC

Soffit Filler Block, as well as all styles and sizes of concrete load-bearing block, are made on this same machine, with one set of Plain Pallets.

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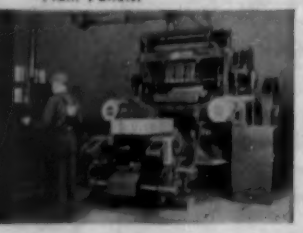
BESSER COMPANY

ALPENA, MICHIGAN, U. S. A.

Complete Equipment for Concrete Block Plants



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IT TURNS IN THE MIDDLE— TAKES THE CORNERS LIKE A BREEZE

United by a joint

Write for literature

Erickson has created a revolutionary new idea in platform trucks—it's ARTICULATED—with a joint or pivot between platform and drive wheels. Models P-7A and P-10A are the units for the new and unusual operations,—autoclaves, for instance—where you need utmost maneuverability with heavy duty capacity. With the ARTICULATED design, platform bed can be made up to 10 or 12 feet and still handle heavy, bulky loads with ease. These articulated models are in addition to the veteran Erickson P-5 and P-7 standard models, and built with the same rugged durability.

the WORKHORSE of LIFT TRUCKS

Erickson

POWER LIFT TRUCKS, Inc.

223 St. Anthony Blvd. N. E., Minneapolis 18, Minn.

INDEX TO ADVERTISERS IN THE CONCRETE PRODUCTS SECTION OF ROCK PRODUCTS

SEE INDEX OF ROCK PRODUCTS SECTION ADVERTISERS ON PAGES 237, 238

Adams Division, LeTourneau-Westinghouse Co. 185
Altavista Concrete Products 227

Berg Vault Co. 222
Bergen Machine & Tool Co., Inc. 213
Besser Company 187, 191, 224, 228
Blue Ridge Talc Co., Inc. 226
Butler Bin Co. 184

Clark Equipment Co. 192
Columbia Machine Works 180
Concrete Weld Co. 226
Cook Bros. Equipment Co. 188
Covington Block Co. 226
Cresci, A., & Son, Inc. 201

Erickson Power Lift Trucks, Inc. 227, 228
Erie Strayer Co. 204, 205
Evans Lumber Co. 226

Fanning-Schuett Engineering Co. 186
Fehrs Tractor & Equipment Co. 227
Fleming Mfg. Co. 221
Florida Division, Food Machinery & Chemical Corp. 203
Food Machinery & Chemical Corp. 203

Gary Steel Supply Co. 226
General Portland Cement Co. 223
Gerlinger Carrier Co. 224
Go Corp. 211

Huber-Warco Co. 217

Ideal Concrete Products & Fuel Co., Inc. 227
Ideal Engineering Co., Inc. 227

Jaeger Machine Co. 183

Kent Machine Co. 222
Knickerbocker Co. 225

Lakeside Gravel & Block Co. 226
Landers Segal Color Co. 226
Lehigh Portland Cement Co. 190
LeTourneau-Westinghouse Co. 185
Lith-I-Bar Co. 229
Lone Star Cement Corp. 194

Marsh, E. F., Engineering Co. 218
Medusa Portland Cement Co. 182
Mid Atlantic Equipment Resale Co. 227
Mid-Western Concrete Equipment Co. 227
Motorola Communications & Electronics, Inc. 189

Neptune Meter Co. 225
Noble Company 193
Nopco Chemical Company 219

Olsen, Gene, Corp. 211
Oronite Chemical Co. 207
Oshkosh Motor Truck, Inc. 209

Quinn Wire & Iron Works 221

Schield Bantam Co. 220
Side-O-Matic Unloader Corp. 223
Smith Chemical & Color Co. 226
Smith, J. Lee, & Co., Inc. 225
Smith, T. L., Co. 215
Southeast Ready Mix 230
Spillman, R. L., Co. 226

Travel Batcher 230
Trinity White Division, General Portland Cement Co. 223
Truckman Div. of the Knickerbocker Co. 225

United Builders 226

Yellen Block Machines 226

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. . . EVER MORE POPULAR

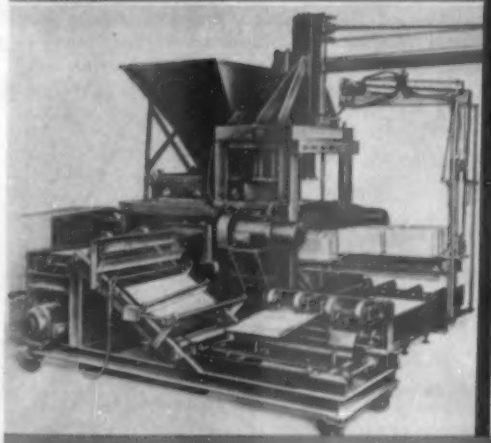
The impressive beauty and permanence of Concrete Masonry Units have helped to make them an outstanding building material. By providing an endless variety of interesting wall patterns modern Concrete Masonry Units offer practically unlimited latitude, giving full freedom to the creative skills of the architect.

The distinctive reputation gained by LITH-I-BLOCK Masonry Units in the building trades for uniformity of dimension, controlled density and even texture produces outstanding results in modern exposed masonry construction. LITH-I-BLOCK's reputation for top-quality makes it the preferred block for all types of construction.

BONUS QUALITY

LITH-I-BLOCK

MADE ONLY ON THE LITH-I-BLOCK MACHINE



MODERN FEATURES OF THE LITH-I-BLOCK MACHINE MEET EVERY PRODUCTION REQUIREMENT . . .

- **BIG VOLUME, LOW-COST PRODUCTION of top quality block.**
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- **OPEN FRAME CONSTRUCTION for simplified maintenance.**

GET THE DETAILS — LEARN HOW LITH-I-BLOCK CAN HELP YOU

LITH-I-BAR CO.

HOLLAND, MICHIGAN

SALES AND SERVICE THE WORLD OVER

LITH-I-BAR CO. HOLLAND, MICH.

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Company_____

Address_____

City & State_____

Moving Day
is no problem with
TRAVEL BATCHER

TRADEMARK

The hopper can be recharged with either a dump truck or a front-end loader, and can be used with 3-, 4-, or 5-yard mixers.

MOVING DAY is no problem with the new on the job TRAVEL BATCHER. Instant maneuverability makes the TRAVEL BATCHER available for several jobs a day, and its speed of operation results in the production of up to 100 yards per hour.

Batch mixture is maintained uniformly with accurate scales mounted on the machine. By bringing the batch plant closer to the job, it reduces the number of truck mixers needed by as much as 83%.

The TRAVEL BATCHER offers the performance of a stationary batch plant, plus the convenience of mobility.

TRAVEL BATCHERS are being used by the largest contractors on Bureau of Reclamation projects, Army Air Force, Navy and Marine installations, Atomic Energy projects, Defence Projects in Alaska, Royal Canadian Air Force Stations in Canada, and on many government and state highway projects.

For additional list of users, for more information and letters of recommendation, write, wire or phone . . .

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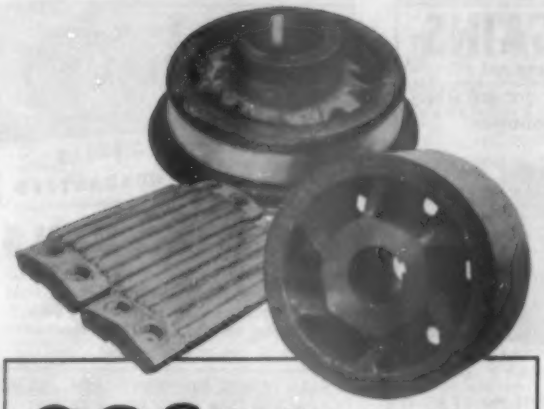

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performance-proven on the toughest jobs

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Provides Steady Flow of Dry, Finely Ground Materials which tend to bridge in storage. Uses only small amount low-pressure air.

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For All Bulk Materials

signals change in level; automatically starts and stops filling and emptying equipment.

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REDUCE DOWNTIME... STOP PRODUCTION LOSSES

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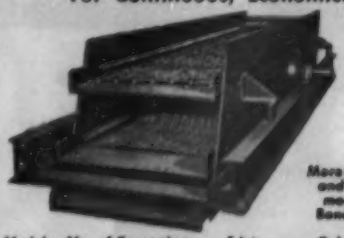
BONDED EQUIPMENT BARGAINS

WRITE, WIRE OR PHONE — IMMEDIATE SHIPMENT FROM OUR FACTORY

NEW BONDED® HEAVY DUTY VIBRATING SCREENS

"For Continuous, Economical Screening of High Tonnages"



More than 5000 mines and quarries have modernized with Bonded equipment

Model Number	No. of Decks	Screening Area	List Price	Sale Price
138BS	1	3'x8'	$ 1244.00	$ 1119.00
238BS	2	3'x8'	1283.00	1165.00
338BS	3	3'x8'	1370.00	1250.00
248BS	2	4'x8'	1881.00	1695.00
348BS	3	4'x8'	2079.00	1850.00
3410BS	3	4'x10'	1969.00	1775.00
3410BS	3	4'x10'	2325.00	2095.00
3412BS	3	4'x12'	2653.00	2395.00

Model Number	No. of Decks	Screening Area	List Price	Sale Price
124AS	1	2'x4'	$ 493.00	$ 355.00
224AS	2	2'x4'	435.00	375.00
126AS	1	2'x6'	449.00	375.00
226AS	2	2'x6'	473.00	395.00
136AS	1	3'x6'	581.00	495.00
236AS	2	3'x6'	665.00	585.00
336AS	3	3'x6'	916.00	815.00
138AS	1	3'x8'	685.00	575.00
238AS	2	3'x8'	761.00	695.00
338AS	3	3'x8'	959.00	845.00

For mineral, chemical and other industrial products. Fast, efficient and economical for cleaning, sizing, grading, dewatering. Made in all metals including stainless steel. Enclosed models for hot materials or dust control. Bonded screens are built for any screening operation, wet or dry.
HEAVY DUTY MODELS: type BS 4-bearing, positive throw, eccentric shaft; 3'x8' to 5' x 14', 1 to 5 decks.
GENERAL DUTY MODELS: type AS eccentric weight mechanism, spring mounted, 1 to 3 decks, 2'x4' to 3'x8'.

Heavy Duty Screens from $1119.00 — **General Duty Screens from $355.00**

NEW BONDED® TROUGHING IDLER CONVEYOR BARGAINS

Complete Ready-Fab sections quickly and easily joined together on the job. We take our loss on our stock of short length belting. You can save as much as 50% on the BONDED CONVEYOR SPECIALS listed, with conveyor belting in two pieces. Conveyors are equipped with 5" roll diam. idlers and return rolls, 20" diam. head pulley and 16" diam. tail pulley mounted on 2¼" or 2-7/16" diam. shaft. Belt is new 4-ply, 28-oz. duck, ⅛" top rubber cover x 1/32" bottom cover and is fresh stock made by leading manufacturers.

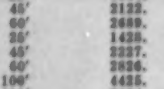
Remember, You Save Up To 50%

CONVEYOR PRICES INCLUDE BELTING

Belt Width	Length of Conveyor	List Price	Sale Price
14"	25'	$ 1165.	$ 672.
14"	50'	2016.	1064.
16"	20'	1870.	892.
16"	45'	1928.	1012.
16"	60'	2494.	1264.
16"	85'	3350.	1685.
18"	25'	1327.	739.
18"	45'	1966.	1085.
18"	60'	2575.	1354.
18"	85'	3466.	1798.
18"	100'	4000.	2065.
20"	25'	1366.	770.
20"	45'	2132.	1145.
20"	60'	2689.	1436.
24"	25'	1438.	835.
24"	45'	2237.	1237.
24"	60'	2826.	1549.
24"	100'	4435.	2339.
24"	130'	5624.	2995.
30"	25'	1535.	915.
30"	65'	3349.	1856.
30"	85'	4629.	2516.

Other lengths & belt widths at bargain prices.

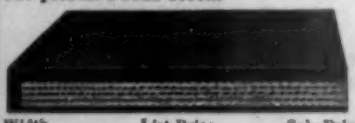
NEW BONDED® FEEDERS



Capacities to 225 tons per hour.
Priced from $280.00

NEW CONVEYOR BELTING SAVE UP TO 25%

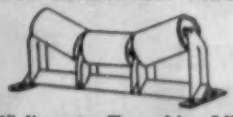
Heavy duty 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover rubber belting having high tensile strength, tough cotton duck, strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily. Famous brands at deep cut prices. Fresh stock.



Width	List Price	Sale Price
14"	$ 3.43 foot	$ 2.75 foot
16"	3.86 foot	2.88 foot
18"	4.27 foot	3.19 foot
20"	4.89 foot	3.89 foot
24"	5.55 foot	4.14 foot
30"	6.77 foot	5.86 foot

Additional widths and plies available at low prices. Write for free sample.

NEW IDLERS AND RETURN ROLLS 25% BELOW LIST PRICE



3-roll, 5" diameter Troughing Idlers for

14" belt	$ 17.25	24" belt	$ 19.75
16" belt	18.00	30" belt	29.50
18" belt	19.00	36" belt	31.25
20" belt	19.25	48" belt	33.75

1-roll, 5" diameter Return Idlers for

14" belt	$ 6.75	24" belt	$ 8.00
16" belt	7.00	30" belt	8.75
18" belt	7.50	36" belt	9.25
20" belt	7.75	48" belt	10.75

All steel. Interchangeable with other well-known makes. Replaceable ball bearings. Either sealed type (pre-lubricated) or with alemite fittings. Maintenance is negligible.

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3—Traylor No. 412 Type TZ Gyratory Crushers.

2—Traylor 8" Gyratory Crushers.

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5—Used single deck Robins Vibrex Screens.

1—Used Cameron pump, Size 10", 2400 G.P.M., 125' head, 1150 R.P.M., Left Hand, Serial No. 57537.

1—Used Cameron pump, Size 10", 2400 G.P.M., 125' head, 1150 R.P.M., Right Hand, Serial No. 57535.

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Compressors	Feeders		Tanks
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Dryers	Kilns		

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200 HP, 435 RPM — 900 H. P., 710 RPM
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20" & 30" Superior McCully Gyratory.
24" x 36" & 48" x 60" Traylor Bulldog Jaw.
1—54" x 24" Pioneer Crushing Rolls.
222R Allis Chalmers Hydro Cone.
42 x 16, 36 x 16 & 30 x 16 Crushing Rolls.
36 x 24 Jeffrey B 75 hp, 440 V. Hammermill.

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15 Ton Diesel 60' Boom Whirley Crane.
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42 In. x 58' STACKING CONVEYOR.
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2000—New Trough. & Return Idlers.
4000 Ft. New 6 Ply 42 In. Belt.

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12 Rod Mills 30" x 54", 4' x 14', 5' x 10', & 6' x 12' Denver, Marcy & A.C.
45 Ball Mills: 3'x4', 3'x7', 4'x5', 5'x8', 5'x10', 5'x18', 6'x5', 6'x8', 6'x10', 6'x9', 7'x5', 7'x6', 7'x7', & 3 Marcy 86.
29—Hardinge Mills: 10'x48", 8'x18", 8'x36", 8'x22", 7'x36", 6'x36", 6'x22", 6x14", 5'x36", 5'x24".

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1—11' x 10' x 235', ¾" shell.
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1—7'6" x 7' x 125', ½" shell.
1—7' x 120', ¾" shell.
1—7'5" x 20' Link Belt, Rote-Louvre.
1—7'x55', ⅜" shell.
1—6'x40', ⅜" shell.
1—6' x 24' Link Belt, Rote-Louvre
1—5' x 67', 5/16" shell.
1—5' x 40', ¾" shell.
1—5' x 30', 7/16" shell.
1—4'6" x 50', ⅜" shell.

CRUSHERS—PULVERIZERS—MILLS

2—Allis Chalmers 10" Superior McCully.
1—Allis Chalmers k-9 Gates Gyratory.
10—Jaw Crushers 5"x6" to 42"x48".
3—Symons Cone 4', 3', 2'.
1—Williams 4 Roll High Side Mill.
1—Raymond 4 Roll Low Side Mill.
2—Pennsylvania #5XR-100, 100 TPH.
3—Hardinge 5'x22", 6'x22", 10'x48".
3—Patterson 6'x8' Ball Mills.
1—Raymond #40 Imp.
1—Williams #20 H.O. Slugger Hammermill.
2—A.C. 6'x22' Tube Mills, 300 HP motors.
1—Allis Chalmers #8722 Compeb Mill.

SCREENS—SEPARATORS

6—Tyler Hummer Screens 3'x5', 4'x5', 4'x7'.
1—Link Belt 3'x8' double deck Screen.
5—Rotex 40"x84", 40"x120".
4—Air Separators 6', 8', 10', 14'.

MISCELLANEOUS

2—Chicago 14"x7" Compressors, 434 cfm.
2—Oliver Rotary Dewaterers 8'x4'.
12—Bucket Elevators 20' to 75' centers.
250 ft. Link Belt 12" Troughing Conveyor.
800 ft. 30" Troughing Conveyor.
1—10,500 gpm Centrifugal Pump 135' head.

Partial List
Your Inquiries Solicited

BRILL EQUIPMENT COMPANY
2401 Third Ave. New York 51, N.Y.
or
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SHOVELS — CRANES — DRAGLINES

Bay City 65 Shovel-Backhoe-Crane, 1¼ yd. Diesel.
N-W 80-D 2¼ yd. Dragline, Diesel, 100' boom.
N-W Model 6, 1¼ yd. Diesel Shovel.
Northwest 80-D Diesel Shovel 2½ yd. New 1952.
Lorain L-520 2-yd. Shovel-Drag-Crane 100' bm.
Lima 1201, 2½ yd. Diesel Shovel.
Manitowoc 3500, 2½ yd. High Lift Shovel.
Buc-Erie 84-B Diesel Shovel, 2½ yd.
Manitowoc 3500 Dragline, 140' boom, new 1950.
Northwest 25 Diesel, ⅝ yd. Shovel.
Lima 604 Backhoe-Crane-Drag. Cat. D13000 Diesel.
Lima 604 Drag. Diesel, 65' bm; New 1954.
N-W 95, Drag. New 1951. Murphy Diesel 80' bm.
N-W 6, Crane-Drag. New 1951. Murphy Diesel
Koehring 605 Shovel-Crane-Dragline Cat. D13000

CRUSHERS

JAW: Acme 10x28, 14x26, 14x28, 10x42, 10x32, 18x32, 25x40, Eagle 36x36, Diamond 24x36", Cedar Rapids 10x20, 20x36, 25x40, Farrell 10x20, 12x30, 14x36, 18x36, 24x48, Buchanan 36x42, Good Roads Reliance 15x30, Traylor 18x36, 24x36, Allis-Chalmers 30x18, Good Roads 10x30, Telsmith 15x32, Traylor 40x60, 42x48, Allis-Chalmers 42x48.
GYRATORY: Allis-Chalmers-McCully, 6", 7½", 8", 9", 12½", 20", 30", 49", 14" Newhouse, 24", 30", Gyrasphere, 12", 36" Intercone Telsmith, Telsmith 8H, 10-B, 12-B, 16-B, Kennedy Van Saun 7, 10, 20¼-S, 27, Traylor 77 1'0", 77 2'0", 77-4¼".
ROLL: Cedar Rapids 60x26, Poinser 40x22, Pioneer 30x18, Telsmith 24x16, Pioneer 36"x18", New Holland 24x16.
HAMMERMILL: Sins 4 Williams Jumbo, Pennsylvania 8X2, 22x22, Cedar Rapids 20x33, Jeffrey 36x42, 36x24, 36x60, Penn 8XH-100, Cedar Rapids 30x36.
BALL MILL: Hardinge 10'x48", K.V.S. 6'x8' Type M Air Swept J-M 6'x8', Hardinge Conical 6'x22', Colorado Iron Works 8'x6'; Marcy No. 64½, Hardinge conical 10'x36".
ROD MILL: March 2'x6', 8'x8'. Allis-Chalmers 4'x8', Hardinge No. H 906. Marcy 5'x12', Hardinge 8'x22".
CONE: Symons 2' and 3' coarse bowl.
TUBE MILL: Smidth 5½x20, K.V.S. 6'x7', Traylor 5'x22'.
DRIERS: Vulcan 4½x50', others 5'x20', 6'x50', 7'x70', 8'x40' and Cedar Rapids 60"x24'.

CRUSHING PLANTS

Cedar Rapids "Pitmaster" port. washing-screening.
Cedar Rapids Portable Super Tandem, excellent.
Austin Western port. Model 101. New 1952.
Pioneer 205W, crushing, washing, screening.
Cedar Rapids 40x33 Port. Secondary, Diesel.
Universal Model 660 Port. Gravel Plant.
Pioneer Port. 11x36 jaw, 40x20 rolls.
Telsmith Sand-Gravel-Screening, large capacity.
Cedar Rapids 4055 hammermill, complete, excellent.
Diamond 66, Port. Prim. 1056. Secondary 3018.

LOADERS

B-G 82A, Hough Payloaders, 1½, 1¼, ¾ yds. AC Model HD-15 3 yd. bucket. Elmco 21 Rocker. Euclid MDL.10-VBX Cummins NH6 Diesel.

CONCRETE PLANTS AND EQUIPMENT

Johnson concrete plant 352 yds. 5 aggr. compt.
Cement silos, Corps of Engr. Spec.
Johnson concrete plant 300 yds. Corps Engr. Spec. 5 aggr. compts. cement silo 2708 bbls.
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Johnson 200 yd. 4 aggr. compt. 200 bbl. cement compt. 1082 bbl. silo.
B-K 400 bbl. cement bin, 600 bbl. silo.
Heltzel 100 ton 3 compartment aggr. bin.
Butler 212 cu. yd. 6 compts. Complete.
Smith 56-E 2 yd. tilting mixer, 40 HP elec. motor.
Cement Unloading System, with 1750 bbl. silo.

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8" H-P twin Diesel drive. Complete.

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American 20 ton Guy Derrick 100' boom, 110' mast.
American Terry 20 ton Guy Derrick, 100' boom.
Guy Derrick, 15 tons, 110' mast, 105' boom.
American 25 ton stiff leg derrick, 90' boom.
Special 25 ton stiff leg derrick, 100' boom.
Nat'l Bridge 20 ton Guy Derrick, 100',
American 20 ton stiff leg, 100' boom.

SCREENS

Telsmith heavy duty washer 60"x18'.
Simplicity 6'x16' four deck.
Symons 4'x14' double deck.
Tyler 4'x10' two deck heavy duty, motor, Gen. Set.
Telsmith 5'x12' dbl. deck elec. motor.
Cedar Rapids 4'x12' dbl. deck elec. motor.
Pioneer 4'x12' 2¼ deck elec. motor.
Pulsator 6'x8' four deck.
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Shepard-Niles 4 ton Monorail cab cranes controlled, 15 HP motor.

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CRUSHERS: 1016 CR, 1218 Acme, 1826 Iowa port, 1524 Univ. 1536 Diamond, 1826, 2026 & 2236 CR, 2540 Iowa JAW, 14, 16, 20, & 30" McCully, 10A, 16B & 20A Telsmith GYR. 2 & 3' CONE. 4022 Pioneer DBL ROLL.
MILLS: 52 Sturtevant Ring Roll. 4x7, 5x7, 6x3, 6x6, 8x3 Ball. 52 & 5A Greendler. Williams 4 & 6A36. 4033 CR Hammer.
DRYERS: 5x30, 5x40, 6x50, 7x80, 7x110 & 8x125.
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Climax Jawcrusher 9x16
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1—6 Williams Jumbo hammermill.

KILNS
1—4' x 40', 7' x 120', Kilns.

DRYERS
1—4½' x 30', 6' x 60', 8' x 125'.

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1—48" x 60", 36" x 42", 30" x 36", 24" x 36", 18" x 36", 12" x 24" Jaw Crushers.
2—42" x 16" Allis-Chalmers Crushing Rolls.
1—48" Telsmith Gyrasphere crusher.
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1—24" x 12" Farrell Bacon Crushing Rolls.
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1—6", 10", 14", 16" and 20" McCully Superior Gyratory Crushers.
No. 3 up to No. 12 Gyratory Crushers.

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Eastern Cement plant desires chief chemist immediately. Prefer man with degree in Chemical Engineering, and experience in the manufacture of Portland Cement. Include in your reply complete details of training, experience, age and other pertinent data. All replies will be confidentially treated and our company personnel knows of this advertisement.

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Cedarapids 2020 double impeller breaker.
10x7 Allis-Chalmers Blake type jaw crusher. Rebuilt
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15 cu. yd. Cedarapids sand drag. New.
60-ton, 2-comp., 8'x18' storage bin w/clam gates.
Special bins to your specifications.
Conveyors—18"—24"—30"—36". Also belting.
18" dia. x 20" face magnetic pulley.

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Brownhoist 1-yd. gas shovel-crane.
Lorain MC-414 20-ton truck crane.
Lorain MC-3 truck crane.
Lorain SP-254.
Lorain TL-25 gas hoe.
Lorain Model 30, ½-yd. crawler shovel-clam.
Speeder Model 60, ½-yd. comb.
Unit Model 614 diesel backhoe.

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Caterpillar D7700, 63 H.P., @ 1000 RPM. Rebuilt.
Caterpillar D13000 6-cyl. diesel engine, Twin Disc. clutch, extended shaft, outboard bearing, 145 H.P. @ 1000 RPM. Rebuilt.
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GMC 12-cyl. twin diesel engine complete from radiator to and including automotive type clutch with gear reduction unit, fabricated base, electric starting system, 200 H. P. @ 1200 RPM. New condition.

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618 Page diesel walker 5 yd. 125' boom
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9-W B-E electric walker 8 yd., 200' boom
1201 Lima 85' boom 3 yd. drag-crane
3500 Manitowoc 2½ yd. 85' drag
95 Northwest 2½ yd. 70' diesel dragline
955 P & H 85' boom, 2½ yd. diesel dragline
2000 Manitowoc 1½ yd. diesel shovel
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604 Lima 65' boom 1½ yd. diesel dragline
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255 PC P&H 20-ton truck crane 80' folding boom, 30' jib
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10' x 200' x ⅝" comb. chamber.
6' x 125' x ⅝" firing hood.
7' x 110' x 9/16" brick lined.
6' x 74' x ⅜" with lifters.
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310-12 with heating coils, cyclone.
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Dixie 36" x 50" Hammermill.
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Tyler 4 x 7 with thermionic unit.
Tyler—5 x 12, 3 x 10 wet type.
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1800 CFM 100 PSI 300 HP Bury.
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25 ton Ind. Brownhoist Diesel Loco. Crane.
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25 ton American Steel Guy Derrick
Koehring 1005 Diesel Crane 2½ yd. 1952.
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2200 CFM C-P OCE Air Compr. 350 HP.
160 HP Caterpillar D-17000 Diesel Unit.

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One Allis-Chalmers 7' x 14' Blade Mill complete with castings, bolts, gear and pinion, etc. Has 125 H.P. Allis-Chalmers, 440-volt, 1165 r.p.m. motor and Link Belt Size 8-140 Herringbone Gear Drive. Equipment has never been used.

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1—BARBER-GREENE CONVEYOR, portable, 24" x30', Troughing type. Gas-powered.

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7—AIR COMPRESSORS, portable, 315 cu. ft. Good condition. Cheap.

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20x36 Cedar Rapids ball bearing Jaw crusher $4500

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30x18 C-R two-roll crusher .$2000

9x36 C-R jaw crusher $1000

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This equipment is nine years old, in actual operation now. If take entire list will dismantel and load on flat car for $500 extra.

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16x16 roll crusher	Pioneer port. Diesel gravel plant	Unit ¾ yd. dragline
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Butler Carscoop	Koehring 1¼ yd. dragline; Cat. Diesel	Bay City ¾ yd. dragline
8 yd. Dumpcrete	17½ ton Diesel locomotive crane	Northwest truck crane
40' bucket elevator	Lessman 1 yd. high lift loader	20 ton lowboy trailer

These machines reconditioned in our newly-built daylight plant. Come see them.

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4-Compartment,
300-500 Ton Steel Bins

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Box 35, Carrollton, Mo.

WANTED

1½ yd. Shovel not over four or five yrs. old, preferable Loraine N.W. or Koehring. Also, wanted used Steel Bins three hundred to five hundred ton capacity.
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INDEX TO WHERE TO BUY

Bacon-Pietsch Co., Inc. 235
Birmingham Rail & Locomotive ..233
Bonded Scale & Machine Co. 232
Brill Equipment Co. 233

Carlyle Rubber Co., Inc. 234
Courchesne, A., Inc. 236

Darien 233
Duderstadt Construction Co. 237

Equipment Corporation of America 236

Fehrs Tractor & Equipment Co. ..236
Fort Worth Sand & Gravel Co. ..235
Foster, L. B., Co., Inc. 232
Frank, M. K. 236

Gibsonberg Lime Products Co. ...236

Heat & Power Co. 235
Heidenreich, E. Lee, Jr. 234
Heineken, W. P., Inc. 234

Illinois Slag & Ballast Co. 237

McCartney Machinery Co. 237
McLeod, Alex T., ...232, 235
Mid Continent Equipment Co. 234
Mississippi Valley Equipment Co. 235

New York Trap Rock Corp. 232
Nussbaum, Carl, Jr. 236
Nussbaum Electric Co. 236

Oaks, G. E. 233
O'Neill, A. J. 233

Pedelty, W. M. 237
Pennsylvania Drilling Co. 233
Perry Equipment Corp. 234

Rowe Contraction Co. 236
The Rubberoid Co. 236

Schaefer, Norm 234
Smith, L. B., Inc. 235
Stein Equipment Co. 233
Stuntz-Yeoman Co. 233
Swabb, Frank, Equipment Co. 235

Thomasville Drilling & Testing Co. 232
Tractor & Equipment Co. 236
Troyer, Stanley B., Equipment Co. 234

Unverzagt, G. A., & Sons 234

Vatta, Sergio 237

Walsh, Richard P., Co. 233

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INDEX TO DISPLAY ADVERTISERS

A. C. F. Industries, Inc. 231
Adams Division, LeTourneau-Westinghouse Co. 185
Allis-Chalmers Mfg. Co. ..30, 44, 104, 105, 173
Allis-Chalmers, Tractor Div. 163
American Brake Shoe Co.
American Manganese Steel Div. 30, 165
Ameco Div. (Pumps Dept.) 163
Brake Shoe & Castings Div. 23
America Car & Foundry Div. 231
Armco Steel Corp. 119
Armstrong-Bray & Co. 160
Atlas Powder Co. 99
Austin-Western 81

Babcock & Wilcox Co. 97
Bailey Meter Co. 38
Baldwin-Lima-Hamilton Corp. 81
Baltimore & Ohio Railroad 159
Barber-Greene Co. 6
Bath Iron Works Corp. 131
Bay City Shovels, Inc. 123
Bemis Bro. Bag Co. 154
Bergen Machine & Tool Co., Inc. 213
Berg Vault Co. 222
Besser Company 187, 191, 224, 229
Bin-Dicator Co. 231
Blaw-Knox Co. 177
Bohn Aluminum & Brass Corp. 48
Bradley Pulveriser Co. 176
Bucyrus-Erie Co. 101
Buell Engineering Co. 103
Butler Bin Co. 184

Calumet Steel Castings Corp. 231
Cape Ann Anchor & Forge Co. 162
Caterpillar Tractor Co. Inside Front Cover, 50
Chain Belt Co. 34
Chase Bag Co. 150
Chrysler Corporation 33
Clark Equipment Co. 37, 192
Colorado Fuel & Iron Corp. 45, 107, 135
Colorado Iron Works 156
Columbia-Geneva Steel Div. 88, 89
Columbia Machine Works 180
Combustion Engineering, Inc. 161
Continental Gin Co. 40
Cook Bros. Equipment Co. 188
Cresel, A., & Son, Inc. 201

Deister Machine Co. 137
Deister Concentrator Co. 164
Dempster Brothers 151
Detroit Diesel Engine Div. 28, 29
Diamond Iron Works Div. 152
Diesel Energy Corp. 143
Dodge Mfg. Corp. 133
Dorr-Oliver, Inc. 109
du Pont, E. I., de Nemours & Co., Inc. 41

Eagle Iron Works 46
Easton Car & Construction Co. 3
Eaton Mfg. Co. 26
Ensign-Bickford Co. 128
Erickson Power Lift Trucks, Inc. 228
Erie Strayer Co. 204, 205
Euclid Division 19

Falk Corporation 147
Fanning-Schuett Engineering Co. 186
Farrel-Bacon 164
Fate-Root-Heath Co. 146
Firestone Tire & Rubber Co. 127
Fiske Brothers Refining Co., Lubriplate Div. 166
Fleming Mfg. Co. 231
Flexible Steel Lacing Co. 174
Florida Division, Food Machinery & Chemical Corp. 203
Food Machinery & Chemical Corp. 203
Frederick Iron & Steel, Inc. 177
Fuller Company 125

Gay, Robert M., Div. 178
General American Transportation Corp. 135
General Motors Corp. 19, 28, 29
General Portland Cement Co. 223
Gerlinger Carrier Co. 224
Giffels & Vallet, Inc. 113
Gilson Screen Co. 168
GoCorp. 211
Goodman Mfg. Co. 163
Goodrich, B. F., Co. 1
Green, A. P., Fire Brick Co. 27
Gulf Oil Co. 8, 9

Hardinge Co., Inc. 162
Hayward Co. 160
Hetherington & Berner, Inc. 231
Hewitt-Robins, Inc. 116
Huber-Warco Co. 217

International Harvester Co. 10
Iowa Mfg. Co. 31

Jaeger Machine Co. 183
Jeffrey Mfg. Co. 18

Kaiser Chemicals Div., Kaiser Aluminum & Chemical Sales ....Back Cover
Kennedy-Van Saun Mfg. & Eng. Corp. 83
Kent Machine Co. 222
Koehring Co. 12, 13
Knickerbocker Co. 235

Lehigh Portland Cement Co. 190
LeRoi Division ....Inside Back Cover
LeTourneau-Westinghouse Co. 95, 97, 185
Link-Belt Co. 111
Link-Belt Speeder Corp. 17
Lith-I-Bar Co. 229
Lone Star Cement Corp. 194
LUBRIPLATE DIV. Fiske Bros. Refining Co. 166

Mack Trucks 117
Manitowoc Engineering Corp. 157
Marion Power Shovel Co. 23
Marsh, E. F., Engineering Co. 218
McDermott Bros. Co. 177
McLanahan & Stone Corp. 146
McNally Pittsburgh Mfg. Corp. 175
Meckum Engineering, Inc. 170
Medusa Portland Cement Co. 182
Merrick Scale Mfg. Co. 174
Mine & Smelter Supply Co. 156
Minneapolis-Moline 149
Morris Machine Wks. 148
Motorola Communications & Electronics, Inc. 189
Murphy Diesel Co. 155

Naylor Pipe Co. 140
Neff & Fry Co. 172
Neptune Meter Co. 225
Noble Co. 193
Nopco Chemical Co. 219
Nordberg Mfg. Co. 42
Northern Blower Co. 138
Northwest Engineering Co. 5

Oliver Corporation 35
Olsen, Gene, Corp. 211
Ore & Chemical Corp. 16
Oronite Chemical Co. 207
Osgood-General 23
Oshkosh Motor Truck, Inc. 209
Owen Bucket Co. 142

Pangborn Corp. 154
Pennsylvania Crusher Div. 131
Pettibone Mulliken Corp. 21
Pfarrer, W. H., Co. 156
Pioneer Engineering Wks., Inc. 121
Plymouth Locomotive Works 145
Poor & Co. 121
Productive Equipment Corp. 172

Quinn Wire & Iron Works 221

Raymond Bag Co. 56
Raymond Div. 161
Reo Motors, Inc. 43
Research-Cottrell, Inc. 11
Resisto-Loy Co., Inc. 176
Rockwell Spring & Axle Co. 92, 93
Roebling's, John A., Sons Corp. 107
Rolfway Bearing Co., Inc. 159
Ryerson, Joseph T., & Son, Inc. 48

Sauerman Bros., Inc. 160
Schild Bantam Co. 220
Screen Equipment Co., Inc. 15
Sheffield Steel Div. 119
Side-O-Matic Unloader Corp. 223
Simplicity Engineering Co. 141
Sly, W. W., Mfg. Co. 144
Smith Engineering Wks. 52
Smidth, F. L., & Co. 24
Smith, J. Lee, & Co., Inc. 225
Smith, T. L., Co. 215
Southeast Ready-Mix 230
Spang & Co. 158
Standard Metal Mfg. Co. 175
Stephens-Adamson Mfg. Co. 175
Sterling Electric Motors 238
Stoody Co. 78, 79
Sturtevant Mill Co. 14
Syntron Co. 20

Tennessee Coal & Iron Div. 88, 89
Thew Shovel Co. 153
Timken Detroit Axle Div. 92, 93
Timken Roller Bearing Co. 4
Travel Batcher 230
Traylor Engineering & Mfg. Co. 7, 171
Trinity White Division, General Portland Cement Co. 223
Truckman Div. of the Knickerbocker Co. ..225
Twin City & Wire Co. 158
Tyler, W. S., Co. 170

Union Wire Rope Corp. 84, 85
United States Steel Corp. 88, 89
Universal Engineering Corp. 21
Universal Road Machinery Co. 178
Universal Vibrating Screen Co. 168

Victor Equipment Co. 169

Wedge-Wire Corp. 178
Western Machinery Co. 167
Western Precipitation Corp. 32
Westinghouse Air Brake Co. ....94, 97, Inside Back Cover
Wickwire Spencer Steel Div. 135
Wilfley, A. R., & Sons, Inc. 150
Williams Patent Crusher & Pulverizer Co. 91
Wood, Charles E., Co. 178
Yuba Machinery Co. 166

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2	24 months	12 months	12 months
3	15 months	3 months	12 months
4	15 months	4 months	11 months
5	14 months	3 months	11 months
6	14 months	3 months	11 months
7	12 months	4 months	8 months
8	15 months	7 months	8 months
9	7 months	1 month	6 months
10	12 months	6 months	6 months
			Average: 9.9 months EXTRA SERVICE

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